
Accession Medical Standards Analysis and Research Activity (AMSARA):

2003 Annual Report

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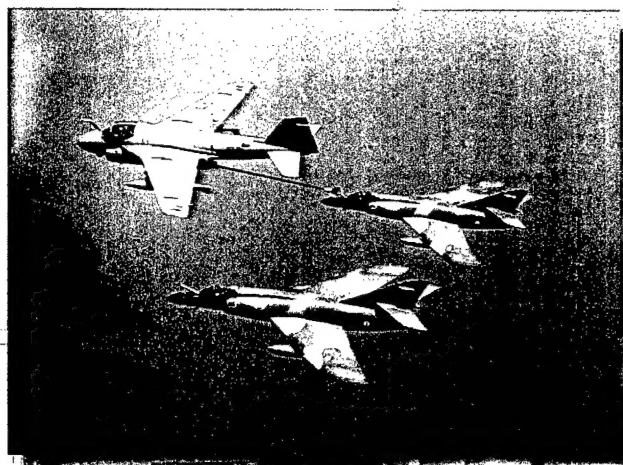
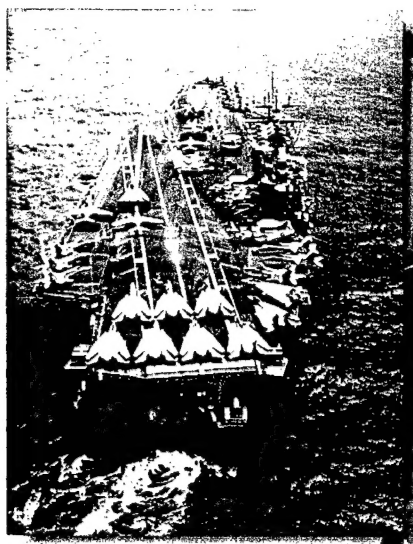
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AMSARA

ACCESSION MEDICAL STANDARDS ANALYSIS & RESEARCH ACTIVITY

2003 ANNUAL REPORT



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Executive Summary

The Accession Medical Standards Analysis and Research Activity (AMSARA) completed the three-year cyclic review of the DODI 6130.4 in support of the Accession Medical Standards Working Group during 2003. **Two significant changes in DODI 6130.4 (to be published in 2004) are a direct result of AMSARA's research and analysis over the past seven years.** Evidence gathered through multiple IRB-approved protocols supports initial qualification of an **applicant revealing a history of asthma that has been asymptomatic since age 13.** Likewise, evidence gathered through epidemiologic analyses supports **initial qualification of an applicant revealing a history of ADHD who has been able to graduate high school or keep a job while off medication for at least a year.** It is anticipated that these changes will allow **2,000 to 3,000 additional applicants per year to be initially qualified for military service,** greatly reducing the workload and expense of processing applicants.

An AMSARA study of discharges due to asthma at Fort Jackson and Fort Knox confirmed that most **asthmatics know of their condition and conceal it at the Military Entrance Processing Station (MEPS) examination.** Given the scope of the asthma concealment at the MEPS, over the past three years AMSARA has been seeking a simple and inexpensive screening test for asthma. This year, **a field test of NIOX (a device to measure exhaled nitric oxide as an indicator of asthma) was completed.** This study (funded by the US Army Accessions Command) identified that **current screening at MEPS misses 85% of applicants with any history of asthma.** The study observation that **>8% of applicants have markedly high nitric oxide levels** requires further research.

REMAIN, a three-year cohort study examining the retention of mild asthmatics first identified at recruit training, has been completed. Although mild asthmatics were 2.8 times more likely to be discharged during basic training, **they were not statistically different from other recruits in early discharge rate or utilization of health care after basic training.** This study supports the Navy policy to retain recruits first identified with mild asthma during initial recruit [K1]training for a trial on active duty.

Four medical conditions were examined in further detail this year: scoliosis, hypertension, headache, and pes planus. Survival analyses demonstrated that **early attrition was statistically greater among recruits waived for scoliosis and pes planus than among recruits entering without a waiver.** Retention was not significantly different between those waived for hypertension and headaches compared to recruits entering without a waiver.

In late 2003, **AMSARA began the Assessment of Recruit Motivation and Strength (ARMS) study** (funded by US Army Accession Command and US MEPCOM) introducing **a physical performance test of applicants and shippers at 5 MEPS.** The study is designed to assess the current medical exam's ability to detect disqualifying conditions (of the upper and lower extremities), and the use of objective testing (push-ups and a sub-maximal step-test) for waiver determinations of selected medical histories.

AMSARA is committed to further development of evidence-based medical accession standards to enable the DoD to enlist the highest quality applicants in more cost-effective manner thereby ensuring a healthy, fit and effective force.

Introduction

The Accession Medical Standards Steering Committee was established by the Undersecretary of Defense (Personnel and Readiness) to integrate the medical and personnel communities so they could provide policy guidance and establish standards for accession requirements. These standards would stem from evidence-based information provided by analysis and research. The committee is co-chaired by the Deputy Assistant Secretary of Defense (Military Personnel Policy) and the Deputy Assistant Secretary of Defense (Clinical and Program Review). Its members include representatives from the Office of the Assistant Secretary of Defense (Force Management Policy), Office of the Assistant Secretary of Defense (Health Affairs), Office of the Assistant Secretary of Defense (Reserve Affairs), Offices of the Service Surgeons General, Offices of Service Deputy Chiefs of Staff for Personnel, and Chief of Personnel and Training (Headquarters, U.S. Coast Guard).

The Accession Medical Standards Working Group is a subordinate working group that reviews accession policy issues. This group is comprised of representatives from each of the offices listed above.

AMSARA was established in 1996 within the Division of Preventive Medicine at Walter Reed Army Institute of Research to support the efforts of the Accession Medical Standards Working Group. AMSARA's mission is to support the development of evidence-based accession standards by guiding the improvement of medical and administrative databases, conducting epidemiologic analyses, and integrating relevant operational, clinical, and economic considerations into policy recommendations. AMSARA has the following six main objectives:

1. Validate current and proposed standards (e.g., should asthma as a child be disqualifying?);
2. Validate assessment techniques (e.g., improve current screening tools);
3. Perform quality assurance (e.g., monitor geographic variation);
4. Optimize assessment techniques (e.g., develop attrition prediction model);
5. Track impact of policies, procedures, and waivers;
6. Recommend changes to enhance readiness, protect health, and save money.

Military staffing to support this effort includes the Deputy Director, Division of Preventive Medicine, COL Margot R. Krauss, and the Chief, AMSARA, LTC David W. Niebuhr.

AMSARA is augmented with contract support through Allied Technology Group. Current staff includes Project Manager, James Onaitis; Senior Biostatistician, Dr. Yuanzhang Li; Senior Analyst, Timothy Powers; Statistician, Weiwei Han; Analysts, Ben Datu and Vibha Vij; Data Manager, Janice Gary; Data Technician, Lorenzo Kennedy; Editor, Therese Grundl.

1. STUDIES

ABSTRACTS

Can Elevated Exhaled Nitric Oxide Levels Help Screen Out Asthmatics at MEPS?

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Purpose

Asthma reliably diagnosed at any age disqualifies an applicant for military service. Unfortunately, the condition is often undetectable, and many applicants do not reveal that they have asthma during the entrance medical examination. Consequently, each year ~1,000 asthmatic individuals are recruited who subsequently require discharge for asthma during IET. Exhaled nitric oxide levels have been clinically correlated with airway inflammation among asthmatics. This study will determine whether an applicant is more likely to reveal their asthma when given an objective measure they are told is correlated with asthma.

Methods

Volunteers for baseline nitric oxide levels were sought among military applicants at a MEPS in Baltimore. Nitric oxide levels were measured in a temperature-controlled room using a standard chemiluminescence technique (NIOX, Aerocrine, Solna, Sweden) three times per volunteer. All applicants are questioned about a history of asthma during the physical examination. In addition to these questions, study volunteers, giving informed consent for study participation, completed a questionnaire about asthma-related symptoms and factors that might affect nitric oxide levels. Volunteers could not be disqualified for information gained as a result of their participation. After the nitric oxide testing, volunteers were told that their level of nitric oxide indicated that they may have asthma. An interviewer, blinded to the applicant's responses to asthma-related questions, questioned each about a history of asthma or potentially related symptoms.

Results

Volunteers ($n = 1,591$) were mostly male (99%), young (median age 20), and representative of the racial makeup of the applicant population (54% white, 32% black). Nitric oxide levels ranged from 2.4 to 268 ppb with a median of 14.9 ppb. Individual nitric oxide measurements were reliable (± 2 ppb). While only 2.2% (35/1,591) of the volunteers revealed history of asthma during the physical examination, 7.3% (116/1591) gave a history of asthma after being told their nitric oxide levels indicated they may have asthma. All individuals who revealed current asthma ($n = 2$), 77% (21/27) of individuals who reported symptoms after age 12, and 60% (34/57) of individuals who reported symptoms potentially related to exercise-induced bronchospasm, had nitric oxide levels of >14 ppb. Only 29% of those with a history of asthma (under both the old and proposed new standards) were detected by the current MEPS exam. Unexpectedly, 20% of all volunteers without any known respiratory problems had FE_{NO} over 100ppb.

Conclusions

Exhaled nitric oxide may be a useful adjunct to the physical exam in processing applicants, but currently lacks the specificity required in a mass screening environment. Other exhaled volatiles will be examined to determine whether the specificity of screening for asthma using exhaled nitric oxide can be made operationally useful. Studies focusing on those with extreme levels of nitric oxide might prove useful in identifying those with disqualifying respiratory disorders.

Accuracy of IET Discharge Classification Types at Fort Leonard Wood: 6-Month Interim Report

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2LT Amanda Cuda, USA MS IV

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Purpose

Attrition in IET is a triservice problem with ~ 15% of all recruits leaving during this period. The cost of this early attrition is in the millions, resulting in the GAO to call for improved screening of applicants. AMSARA has studied the losses for pre-existing (EPTS) medical conditions; however, there are many more early discharges coded as administrative or other medical. In the Army, the top three classifications of IET discharge covered by Army Regulation 635-200 are EPTS (chapter 5-11), other mental and physical conditions (chapter 5-17), and entry-level separation (chapter 11). To examine the validity of the Army coding system for IET discharges, a cross-sectional study performed the following. In addition, this study examined the frequency of more than one indication for discharge and described the use of medical care among those discharged. The first 6 months of data are presented here.

Methods

All discharges occurring at Fort Leonard Wood from 30 September, 2002 to 30 March, 2003 were included in this study. All discharge forms, administrative paperwork, counseling statements and medical visits were entered into an ACCESS database. A random sample (10%) was selected to identify the co-existence of mental health conditions among those receiving non-EPTS discharges. This sample was independently reviewed by two physician blinded as to the discharge coding assigned at Fort Leonard Wood.

Results

A total of 1,442 soldiers were discharged from Fort Leonard Wood during the study period. Since 88% (1268/1442) of all discharges were classified under chapters 5-11, 5-17, and 11 (34%, 28%, and 26%, respectively), further study was limited to these three categories. Psychiatric conditions accounted for only 2.5% of chapter 5-11 (EPTS) discharges. In general, Chapter 5-11 (EPTS) discharges occurred early during the training period with no evidence of co-existing problems (training or behavior difficulties). 41% of the chapter 5-17 (other medical and physical conditions) discharges revealed some evidence of pre-existing medical conditions, with only 13% of the chapter 11 (entry level) discharges possibly having preexisting medical conditions. Those receiving a chapter 5-17 discharge were more likely to have utilized mental health clinics than those discharged under chapter 11 (63% and 15%, respectively). Overall, the most common mental health diagnosis was adjustment disorder (ICD9 309); however, diagnoses that may require medication (depression, psychotic disorders) were more commonly discharged under chapter 5-17 (46%) or chapter 11 populations (36%).

Conclusions

This study demonstrated that evidence of mental health co-morbidity is commonly found among those discharged under the categories of entry-level separation (Chapter 11) and other medical and physical separations (Chapter 5-17). Thus at Fort Leonard Wood, the low percentage of EPTS discharges for mental health conditions (2.5% versus 20-30% expected) can be accounted for by the practice of coding psychiatric conditions under non-EPTS codes. Relying on EPTS coding alone will underestimate the burden of mental health conditions contributing to discharge.

Comparing EPTS discharge diagnosis between training sites and services is not operational or clinically useful as coding is influenced by medical practices and commanders emphasis that is difficult to quantify.

Project REMAIN: Evaluation of Navy Policy to Retention of Mild Asthmatics

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and Timothy Powers**

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Purpose

Policies affecting retention on active duty have historically been made in response to economic and political pressures without study of their impact. Project REMAIN was designed to provide evidence to support or negate the Navy's anticipated policy change to retain mild asthmatics first identified during recruit training. Prior to this study, the Navy routinely discharged individuals diagnosed with asthma during recruit training, resulting in more than 300 discharges per year at an annual cost of more than \$3 million.

Methods

A nested case-control study was conducted at Great Lakes Naval Training Center from 26 July 2000 through 25 July 2002 to evaluate the impact of retaining mild asthmatics. Recruits with mild asthma (as defined by the Second Expert Panel, National Asthma Education and Prevention Program, 1997) were started on standard asthma treatment and returned to basic training. Three recruits without asthma were matched to each case of asthma based on gender, age, race, and date of entry onto active duty. Asthmatics and controls were monitored for outpatient visits, hospitalizations, and early discharge through August 2003.

Results

During the two years of the study, 136 cases and 404 controls were enrolled. Discharge before graduation from training was significantly higher for cases retained with mild asthma compared with controls: 45% (61/136) and 16% (63/404), respectively. Discharge for persistent asthma symptoms (30/136) and mental health diagnoses (10/136) accounts for the higher discharge rate among cases. However, among recruits who graduated from recruit training, there was no difference in retention between cases and controls: 72% and 70%, respectively. No hospitalizations or deaths related to asthma occurred during the study.

At the end of the study, 40% (54/136) of the cases who would normally have been discharged were still on active duty. Discharge for asthma has been greatly reduced from 380 in 1999 to 119 in 2001; that appears to be holding steady for the past three years since routine implementation of this new policy.

Conclusions

Project REMAIN provides evidence that supports the Navy's new policy of retaining recruits first identified with mild asthma during training. Recruit training is a stressful period that screens out those who cannot mentally or physically serve in the military. After graduating from basic training, there appears to be no difference among those diagnosed with mild asthma and the matched controls. This significant proportion (40%) of recruits remaining on active duty without adverse effects represents a cost savings of

\$1.6M to the military. This study represents the first scientific evaluation of proposed policy change prior to full implementation, demonstrating the cost-effectiveness of using this approach.

Evaluation of Army Recruit Medical Discharges (EPTS) Attributed to Asthma

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Background

More than 1,200 new recruits are discharged every year for preexisting asthmatic conditions, costing the DoD approximately \$42 million per year. An investigation into the characteristics of those lost early in training secondary to asthma was initiated under scientific protocol approved by the IRB at WRAIR.

Methods

A descriptive study was conducted from 1 January 2002 to 31 December 2003 at Fort Jackson, SC, and Fort Knox, KY, using a questionnaire for all soldiers being discharged for a medical reason (EPTS). The voluntary questionnaire was administered during the medical out-processing. The questionnaire included 1) the reasons for nondisclosure (if applicable) at the time of MEPS medical examination; 2) perceived severity of the condition; and 3) desire and ability to remain on duty. Subjects were stratified according to the training site and the nature of the discharge (asthma vs. nonasthma); questionnaire results were then compared.

Results

Response rate of the study was excellent with 86% (3275/3815) of all recruits receiving an EPTS discharge during the study period completing the questionnaire. Of special note was the dramatically different distribution of asthma EPTS discharges between the two training areas, with the larger training base, Fort Jackson, accounting for only 21.5% of all asthma discharges (Fort Jackson trains ~2.7 times more recruits than Fort Knox). Perceived severity of asthma leading to EPTS discharge was lower at Fort Knox than at Fort Jackson, (55% vs 69% respectively, reporting that they would seek follow-up medical treatment for asthma after discharge). Few of those discharged for asthma felt they could have completed basic training: 9.9% at Fort Jackson and 4.9% at Fort Knox. Concealment of the condition at the time of MEPS examination was reported by 52.5% of all asthma discharges vs. 81.7% of the non-asthma discharges.

Discussion

The difference in asthma-related EPTS discharges between two training sites emphasizes the difficulty in comparing diagnosis-specific EPTS discharges between sites. It is unlikely that there were significantly more asthmatics sent to Fort Knox versus Fort Jackson. The significant difference between these posts is more likely due to differences in the standards used to initiate a discharge due to asthma, the medical evaluation process, and the command environment. This study confirms that concealment of medical conditions among military applicants during the MEPS process is the most common reason for EPTS discharge. Identification of known asthmatics at MEPS would decrease EPTS discharges.

Survival of Recruits Waived for Scoliosis

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Background

In order for the military to be successful, its members must be physically fit. Recruits that fail to complete IET or their service obligation inflict a large fiscal burden on the military and affect force readiness. The goal of this study is to determine whether or not recruits who entered active duty in the Army, Navy, Air Force, and Marines between 1 January 1995 and 31 December 2001 with a medical waiver for scoliosis experienced a greater rate of premature discharge and hospitalization compared with a control group.

Methods

We conducted a retrospective cohort study of enlisted recruits entering active duty in the Army, Navy, Air Force, and Marines between 1 January 1995 and 31 December 2001. The study group included enlisted recruits who entered active duty with a medical waiver for scoliosis. Individuals in the study group were matched to a comparison group in a 1:3 ratio. The study and comparison groups were followed from entry into training through 31 December 2001. AMSARA looked for three outcomes: early EPTS discharge from recruit training, first hospitalization, and premature discharge from active duty.

Results

Recruits who entered active duty with a waiver for scoliosis had a lower probability of completing two years of active duty than other recruits and were at increased risk for both EPTS discharge and premature discharge for a medical condition. The evidence indicates that recruits who entered active duty between 1 January 1995 and 31 December 2001 with a waiver for scoliosis experienced a greater rate of premature discharge compared with a demographically matched control group (Fig. 1).

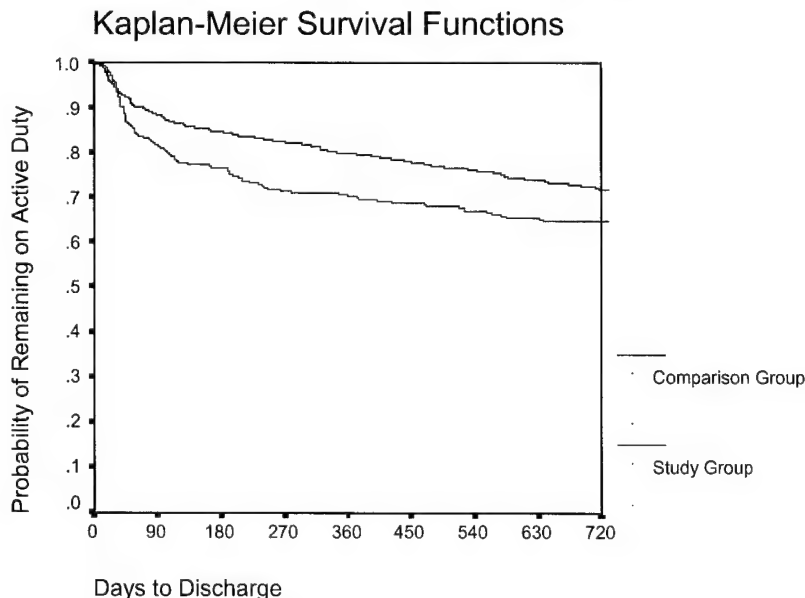


FIGURE 1. SURVIVAL OF RECRUITS WAIVED FOR SCOLIOSIS.

Attrition and Morbidity of Recruits Waived for Hypertension: 1995–2001

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Background

The estimated prevalence of hypertension in the general U.S. population of military recruiting age (age 20–34 years) is 8.6% for males and 3.3% for females. Although hypertension can be a serious chronic disease, the effect of hypertension on the retention of recruits has not been studied. Current DoD standards disqualify applicants who have an average of three consecutive blood pressure measurements of 90 mmHg diastolic or 140 mmHg systolic and any high blood pressure requiring medication or a history of treatment. Applicants disqualified for hypertension may apply for a medical waiver. This study follows recruits granted a waiver for hypertension to determine whether current procedures are effective in identifying and waiving only those recruits with a history of hypertension who are at low risk of failure.

Methods

The study population was made of DoD first-time enlistees with waivers for hypertension (excluding Air Force because of small numbers) who entered service between 1 January 1995 and 31 December 2000 and were followed through 31 December 2001. Cases were matched to fully qualified controls by service, gender, age, race, and accession date. Comparison of BMI and degree of hypertension was performed. Subjects were followed for up to two years of service for hospitalizations, EPTS discharges, and all-cause discharges. Mantel-Haenszel relative risk calculations and Kaplan-Meier survival analyses were performed (Fig. 2).

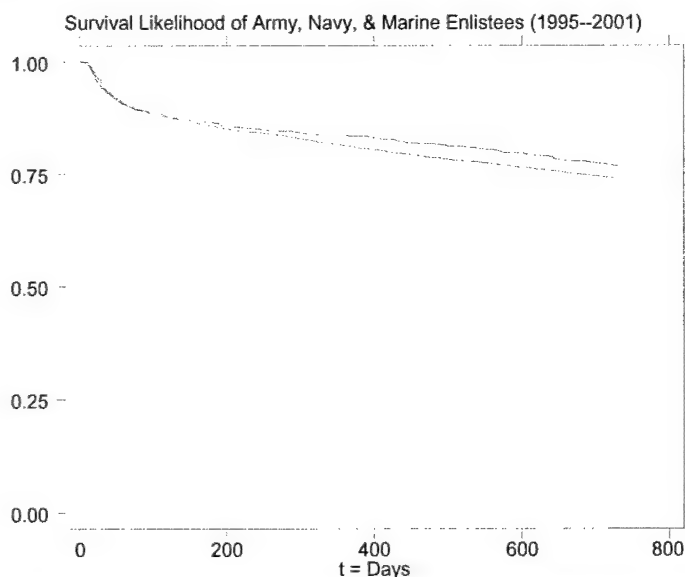


FIGURE 2. SURVIVAL OF ENLISTEES WAIVED FOR HYPERTENSION: 1995–2001. Log-rank test for equality of survivor functions, $p = 0.19$.

Results

A total of 1,063 enlistees waived for hypertension were identified and matched to 3,195 matched fully qualified controls. All-cause hospitalizations were identified in 98 waived and 327 controls with a relative risk of hospitalization of 0.90 (95% CI 0.73, 1.10). All-cause attrition was similar in waived cases ($n = 404$) compared with controls ($n = 1,285$). Relative risk was 0.94 (95% CI 0.87, 1.00), and log-rank test for equality of survivor functions was not statistically significant ($p = 0.19$). All-cause EPTS discharges were identified in 49 cases (13 were from hypertension) and 146 controls (one was from hypertension). The

severe hypertensive category (stage II disease) was more common in cases than controls: 16% vs. <1%, respectively. The category of overweight or obese was more common in cases than controls: 63% vs. 44%, respectively.

Discussion

The hypertensive waived cases had no difference in frequency of first-time hospitalization compared with the fully qualified control group. The severe hypertensive group had a higher rate of hospitalization than those in the overweight and hypertension categories. Survival analysis showed no evidence of a difference in attrition between groups. These results substantiate the current hypertension accession waiver policy and provide evidence for making the accession standard less restrictive, e.g., qualifying prehypertensive applicants who control the condition by lifestyle alone. Further study with longer follow-up and with a cost-benefit analysis will be needed to substantiate this recommendation.

Attrition of Recruits with Preexisting Recurrent Headaches

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Background

Military candidates are asked to report any history of recurrent headaches, although the effectiveness of the subsequent waiver process for the condition has not been evaluated. The U.S. military has developed procedures to only accept applicants who are deemed physically capable of meeting the unique demands of service. To help assess current accession waiver criteria, AMSARA analyzed recruits who were allowed to enter the service with preexisting recurrent headaches.

Methods

A retrospective cohort survival analysis was performed on males and females in the armed forces who enlisted between 1995 and 2000. The headache group was composed of 174 first-time active duty enlistees who required an accession medical waiver for headaches and nothing else. The comparison group was randomly selected from military recruit data and consisted of 522 enlistees who did not require an accession medical waiver. The probability of early discharge for those with a waiver for a history of headache was determined against a matched comparison group. Early discharge was defined as a separation in <2 years (730 days) from the date of entrance.

Results

Kaplan-Meier survival analysis revealed no statistical difference between the headache and healthy groups, with a hazard ratio of 0.98 (95% CI 0.6, 1.4). Individuals accepted for military training with a recurrent

headache waiver have similar retention rates to matched healthy individuals without headache waivers (Fig. 3). This evidence indicates that current waiver standards for recurrent headache are appropriate.

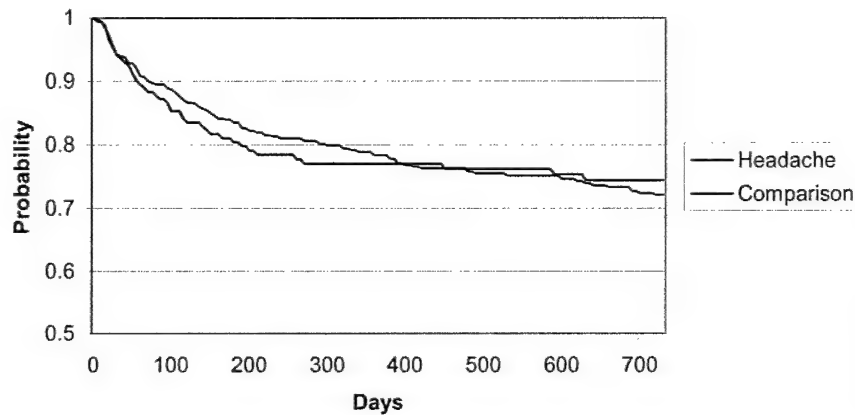


FIGURE 3. PROBABILITY OF REMAINING ON ACTIVE DUTY AMONG HEADACHE SURVIVAL STUDY SUBJECTS: ALL SERVICES. Kaplan-Meier survival analysis for entire group (log-rank test, $p = 0.91$).

Survival of Recruits Waived for Pes Planus: 1995–2001

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Background

All military services depend on recruitment and accession to maintain strength. Part of these processes is the determination of medical fitness. Orthopedic conditions, such as pes planus, are among the most common medical diagnoses in the general population and in the military, with a prevalence of 10–20%. Pes planus is disqualifying for military service. Nevertheless, at ~7.0% of all medical waivers, the condition is a relatively common cause of waivers. Evidence-based medical accession standards are needed to minimize premature medical attrition. This study examines whether military recruits who obtained a waiver for pes planus are more likely than recruits without such a waiver to be discharged.

Methods

We conducted a retrospective cohort study of individuals who entered active duty between January 1995 and December 2000 with a waiver for pes planus that were matched to a group of fully qualified enlistees. They were followed from basic training through December 2001 for outcomes of hospitalization and discharge. Kaplan-Meier analysis was performed to estimate the survival function with respect to these outcomes (Fig. 4).

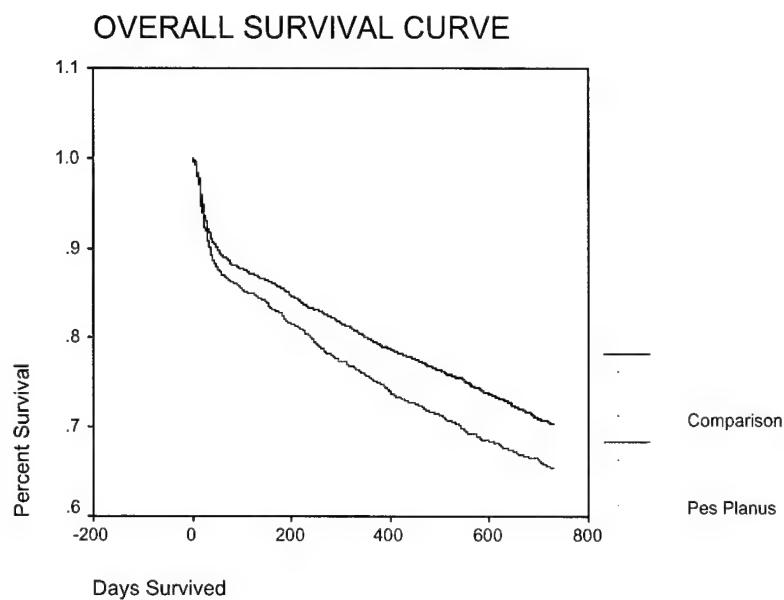


FIGURE 4. TWO-YEAR SURVIVAL ANALYSIS OF RECRUITS WITH PES PLANUS VS COMPARISON GROUP: 1995–2001.

Results

A total of 1,499 pes planus waivers who accessed into the military were identified and compared with 4,496 fully qualified accessions. Hospitalizations for any cause were identified in 168 recruits waived for

pes planus and in 491 of fully qualified recruits, relative risk of hospitalization 1.4 (95% CI 1.13, 1.88). For EPTS discharges, the pes planus group revealed 74 EPTS discharges vs 155 in the fully qualified group, relative risk of EPTS discharge 1.4 (95% CI 1.13, 1.88). A significant difference in all-cause discharge was found between the pes planus and fully qualified groups ($p = 0.0002$), relative risk of any discharge 1.2 (95% CI 1.09, 1.27). The differences in survival between groups varied by service and gender.

Discussion

Recruits waived for pes planus in this study experienced hospitalization, EPTS discharge, and all-cause discharge within the first two years of service more frequently than fully qualified recruits. This may be due in part to the intensity of military training. These findings alone do not provide evidence to change either the current accession standards or waiver criteria for pes planus, because most waived cases survived the first two years of service. Further study in the area of diagnosis and management of pes planus, as well as a cost-benefit analysis of different potential policy standards, will allow DoD to meet the often-contradictory goals of maximized accession and minimized attrition.

ATTRITION MODELING

Studying Early Attrition by Time-Dependent Proportional Modeling: Going Beyond the Cox Model

Introduction

Previous AMSARA attrition models have examined attrition from enlisted service as a function of predictor factors known to be related to the likelihood of early attrition (e.g., accession medical waiver, service, gender, age, and race). In these analyses, the outcome variable for each individual is dichotomous—discharged, yes or no.

A natural extension of these analyses would be to look at the *length* of service time as a function of these predictor variables. In such an analysis, standard multiple regression techniques are inappropriate because the dependent variable (service time) is most likely not normally distributed and is often incomplete, such as when the subject is still in the service at the time of study.

A frequently used approach for this type of analysis is the proportional hazards model, first suggested by D.R. Cox in 1972. The underlying assumption is that the effects of all predictor factors on hazard are constant over time; i.e., we assume that the hazard ratios associated with any two combinations of the predictor factors are constant over time. This assumption, however, may not be plausible in the case of military attrition. For example, it is conceivable that age is a stronger predictor of risk during basic training (when the physical demands are most rigorous) than at some time after basic training. In such a case, when the impact of some of the covariates depends on time, nonproportional hazards models should be used. This study examines the proportional hazards assumption in modeling early attrition among military enlistees. An alternative attrition model is also considered to examine time-dependency effects among attrition predictors.

Subjects and Methods

All first-time enlistees who began active duty service during January 1995–December 2001 were included in the analyses. Accession records on these individuals were linked with military personnel records to determine whether a subsequent early attrition occurred. In addition to the accession and attrition data, the demographic factors (e.g., gender, age, race, marital status, education level, AFQT, BMI, medical qualification, number of dependents, and geographic factor, the MEPS) are included. In previous studies, these factors have been strongly related to the likelihood of attrition.

Two different survival models are used: Cox proportional hazards model and the time-dependent proportional model.

Cox Proportional Hazards Model. The Cox proportional hazards model (model 1) is depicted below.

$$h_i(t) = h_0(t) \exp(\beta_1 x_{i1} + \cdots + \beta_k x_{ik}) \quad 1$$

where h is the hazard function, which is the instantaneous probability of failure at time t , given survival up to t . The terms x_{i1}, \dots, x_{ik} represent the covariates associated with attrition, and β_1, \dots, β_k are the coefficients to be estimated. The term $h_0(t)$ is the baseline hazard and is the hazard for an individual with all independent variables equal to zero. AMSARA tests the proportional hazards assumption by applying the model at different intervals of service time and checking the coefficients for consistency.

Time-Dependent Proportional Model. Any number of models could be conceived to allow for variation in effects of the covariates on attrition likelihood over time. One such model (model 2) is depicted below.

$$h_i(t) = h_0(t) \exp\left(\sum_{j=1}^K x_{ij} \beta_j [1 + \gamma_j \ln(t) + \eta_j \ln(t)^2]\right) \quad 2$$

In addition to having a term for each covariate without time involved, each covariate is also included as a multiple of the natural logarithm of time and of the squared natural log of time, represented by unknown parameters γ and η ; see model 1 for definition of other terms. Note from model 2 that if all coefficients on the time-dependent terms are zero, the model reduces to model 1. If the coefficients on the $\ln(t)$ terms are equal to a common constant, and those on the $\ln(t)^2$ are also equal to a common constant, then this model becomes a special frailty model.

A basic principal in model estimation is to minimize the number of terms by eliminating those that add little to the accuracy of estimates. Hence, in the time-dependent proportional model we will delete all terms for which the coefficient estimates are not significantly different from zero.

Results

Figure 5 shows the coefficients from the Cox proportional hazards models and indicates the effects of several covariates on Army attrition hazard at different times in service. If the proportional hazards assumption were true, the estimates for each covariate would lie roughly along a horizontal line. It is clear that this is not the case for most of the covariates, casting doubt on the proportional hazards assumption for the Army. Most are decreasing, and some show nonlinearity. Similar results were found for these covariate effects on attrition in the other services. These results indicate that a time-dependent model would be more appropriate.

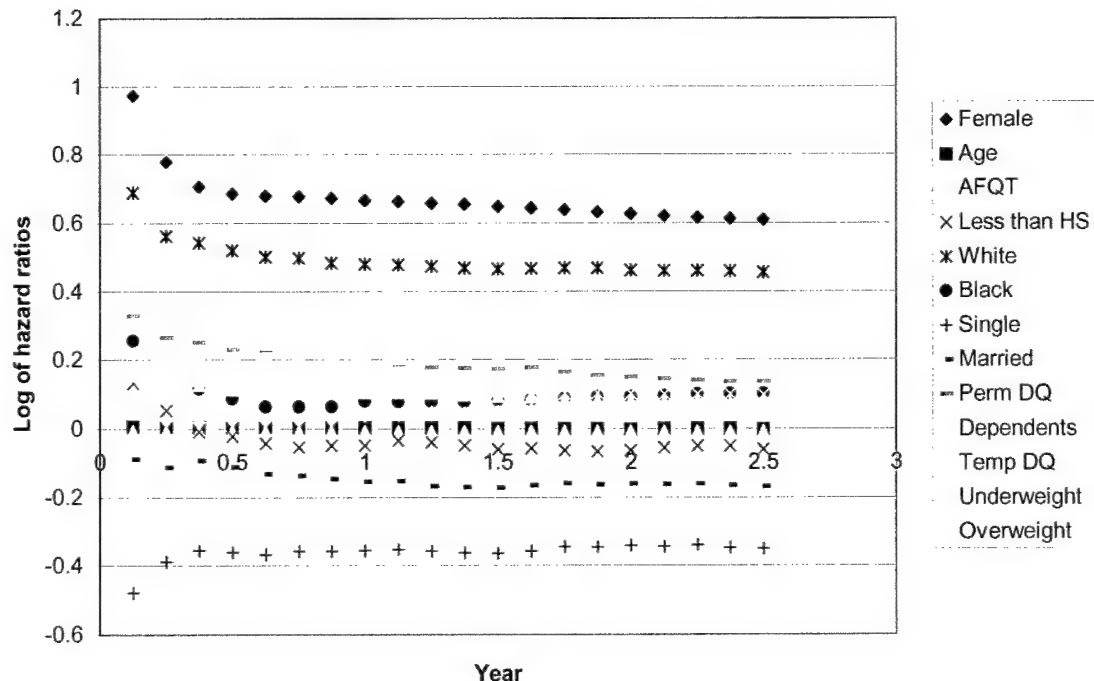


FIGURE 5. LOG OF CUMULATIVE HAZARD RATIOS IN THE ARMY.

We therefore performed the time-dependent model (model 2), which allows for interaction between each covariate and the natural log of survival time. Due at least in part to the large sample size, almost all

interaction terms were significant. Factors significantly intertwined with time included gender, age, race, education level, weight, and AFQT score. In some cases, however, the interactions were not only statistically significant but were also large in magnitude. This further confirms the observation, illustrated in Figure 6, that the covariate effects on attrition likelihood vary over service time.

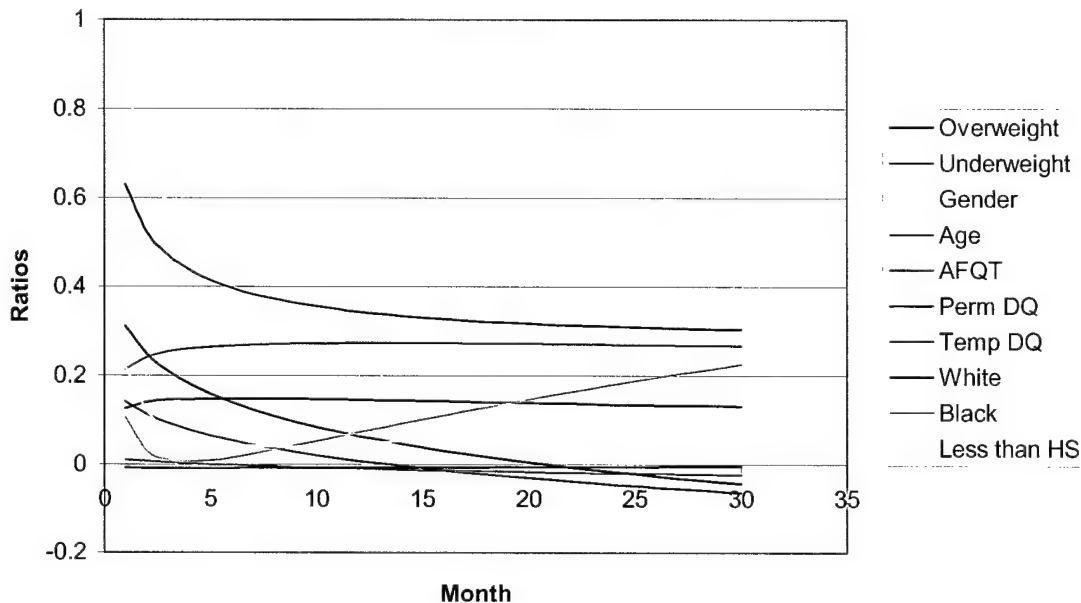


FIGURE 6. ADJUSTED HAZARD RATIOS IN THE ARMY: NONLINEAR MODEL.

Initial “permanent” medical disqualification (with subsequent accession medical waiver) is a major focus of AMSARA. For this factor, the term involving the natural log of time was significant, but the square of the natural log of time was not. For those with a medical disqualification and subsequent waiver, attrition during the first 3 months of service is 25–30% higher than among those who had no medical disqualification. However, at the 1-year point, the difference is reduced to only 6%, and at the 2-year point there is no difference. So those with a known medically disqualifying condition are at a higher risk of attrition initially, but those who get past this initial period are as likely to be retained as those not medically disqualified.

Temporary medical disqualifications (for conditions that can be amended before service begins, e.g., recent marijuana use) were also associated with increased attrition likelihood in each service. This effect diminished as the time served increased, but subjects with such an initial disqualification were at somewhat higher risk for instantaneous attrition over the entire first term of service.

Also from this model, attrition among overweight recruits in the Army is 14–15% higher than attrition among Army recruits of ideal weight, with little difference over time. In the Navy the difference is 4–5%, also fairly stable over time. In the Marines and Air Force, the effect of being overweight versus being of ideal weight at the time of enlistment varies over service time.

Conclusion

The effects of demographic and other factors related to likelihood of attrition among enlistees are not constant over time. Thus, the popular Cox proportional hazards modeling approach might be inappropriate for modeling these effects. Extension of the proportional hazards model technique to include time-dependent terms yielded information about the changing effects of attrition predictors during service time. Some of these time-related changes were found to be dramatic and to depend on the covariate and service being considered. Future modeling of attrition likelihood based on factors known at the time of application for service should account for time-dependent effects of the predictors.

Detecting Abnormal Attrition Changes at an Early Stage: Application of the Random Effects Model and Agreement Testing

Introduction

Early attrition among enlistees is a costly problem for the U.S. military, and various attrition reduction measures have been tried. A related technical problem is how to determine whether a newly measured attrition level indicates a change in the underlying attrition pattern. Such a determination is difficult to make, because relatively large fluctuations in short-term attrition rates may be caused by seasonal patterns, differences in the demographic profile of recruits, or simply random fluctuations. The aim of this study is to develop attrition modeling that will account for these factors so that changes in core attrition rates can be detected at short-term intervals.

Subjects and Methods

All first-time enlistees who began active duty service during January 1995– September 2000 were grouped according to the month and year of beginning military service. For each month/year group, attrition percentages during the first 3 months of service were determined. In addition, a demographic profile will be developed for each group, including the distribution of gender, race, AFQT scores, etc. In previous studies these factors have been strongly related to likelihood of attrition.

The raw attrition rates by month/year group over the 60 months from 1995 to 1999 will first be examined and adjusted for both seasonal and long-term trends by differencing if necessary. The remaining attrition for the sequence of month/year groups will then be examined for homogeneity. In the event that homogeneity is not yet achieved, random effects regression models will be developed to regress the remainder attrition rates against the demographic profiles. These models allow both for the possibility of random variability in any given month's attrition rate and for random variability across months.

This dynamic regression model will then be used to predict the attrition rate for the month/year groups of 2000. Actual attrition levels for these groups will be compared with predicted levels from the random effects models.

Results

The examination of raw attrition rates revealed strong seasonal patterns in short-term attrition for each service branch. In particular, recruits who began duty in the summer were more likely to continue in service than those, who began duty in the early months of the year. After adjustment to account for these seasonal patterns, it was also seen that the monthly remainder loss rates were not purely random noise. Instead, these rates were related to the demographic features of the recruit groupings.

Accordingly, AMSARA applied random effect regression models to model attrition rates within 1, 2, and 3 months of service against the demographic features. If the variance between months is negligible, then the random effect model is the same as a fixed effect model. That is, after controlling the demographic factors, the residuals of the attrition rate are subject to the same distribution, and they are homogeneous. This was found to be the case for attrition in each service branch other than the Air Force.

Agreement Test for Enlistees Entering Active Duty in 2000

Table 1 shows the agreement measurements, which test the difference between actual and predicted attrition, for each service from January to September 2000 by service. This period was used because at the time of analysis, the data on discharges through the end of the calendar year were incomplete. In several instances the difference between actual and predicted attrition is statistically significant.

For example, attrition among Army recruits beginning duty in January 2000 was significantly lower than predicted at 1, 2, and 3 months of service. For those beginning in June and July, however, attrition was significantly higher than predicted. Attrition among Navy enlistees was lower than predicted for those beginning duty in January and July for all lengths of follow-up, as well as in May and September for selected follow-up times. Attrition was significantly higher than predicted among Marines beginning duty in March, April, and May for any length of follow-up. Finally, attrition was significantly lower than expected among Air Force enlistees beginning service in May, August, and September at all lengths of follow-up.

Finally, it is apparent that the actual attrition among Navy enlistees is consistently and significantly lower than predicted. If there is no change in underlying attrition over time, one would expect the actual attrition to vacillate around the predicted level—sometimes higher and sometimes lower and with few large differences. The Navy result indicates a possible downward trend in attrition. Further examination is warranted.

TABLE 1. COMPARISON AGREEMENT TEST OF ACTUAL TO PREDICTED ATTRITION BY SERVICE AND TIME OF FOLLOW-UP FOR JANUARY TO SEPTEMBER 2000

Month entered active duty	Time of follow-up after entry onto active duty	Army, fixed	Navy, fixed	Marines, fixed	Air Force	
					Fixed	Random Effect
January	1 mo	-3.66	-4.29	0.12	-1.23	-0.88
	2 mo	-5.24	-4.18	-0.09	-1.28	-0.92
	3 mo	-4.73	-3.78	0.65	-0.49	-0.42
February	1 mo	-0.33	0.88	-0.93	-2.99	-1.87
	2 mo	0.36	0.16	1.90	-2.07	-1.38
	3 mo	0.70	-0.52	2.87	-1.15	-0.82
March	1 mo	1.88	-1.33	3.03	1.06	0.51
	2 mo	0.44	-2.26	4.86	2.69	1.61
	3 mo	-0.28	-1.90	7.12	2.43	1.51
April	1 mo	0.44	-0.73	4.71	-0.60	-0.53
	2 mo	-1.97	-0.35	6.70	0.71	0.33
	3 mo	-1.65	-0.27	7.12	1.57	0.98
May	1 mo	1.22	-0.71	3.11	-6.34	-3.40
	2 mo	1.31	-3.69	4.33	-3.78	-2.22
	3 mo	2.00	-4.15	3.95	-3.84	-2.31
June	1 mo	4.11	-5.66	0.57	-4.32	-2.22
	2 mo	2.96	-7.53	2.14	-1.11	-0.72
	3 mo	3.73	-6.29	2.08	-1.60	-1.01
July	1 mo	4.42	-1.35	2.00	-1.14	-0.72
	2 mo	7.55	-0.80	3.15	0.44	0.14
	3 mo	6.69	-0.66	2.17	0.43	0.15
August	1 mo	4.28	-0.30	-1.15	-8.93	-3.42
	2 mo	-1.53	-1.23	0.47	-5.61	-2.65
	3 mo	-4.21	-1.53	0.72	-6.15	-2.98
September	1 mo	0.47	-4.40	-3.24	-14.57	-4.47
	2 mo	-0.78	-0.41	-0.45	-11.04	-4.63

Discussion

In total, several cases of actual attrition differ significantly from the attrition that was predicted. Although there is no "correct" number of significant differences, it is doubtful that core attrition changed so many times over such a short period in each service. Further examination of the month/year groups showing attrition disparities indicates that additional important demographic factors may be involved, even though many of these were already controlled for in the modeling. Future work will involve more extensive consideration of these factors to refine the attrition prediction model.

This study is limited by inability to control for attrition reduction programs that may have been installed during 1995–1999, the period used to model baseline attrition. Such programs might have altered attrition for some month/year groups, causing bias in modeled effect estimates.

Attrition Differences among Enlistees by State of Residence

Introduction

Previous AMSARA studies have identified several factors associated with the likelihood of early attrition from enlisted service, which were based on the individual factors. Studies performed separately from AMSARA have observed that state of residence might affect the likelihood of attrition. In this study, AMSARA further establishes the effect of state of residence and examines the extent to which it may involve other demographic factors by region. A statistical test for homogeneity of attrition rates is proposed and applied to determine geographic and factor effect differences.

Methods

We will first evaluate the discharge rate among enlistees according to state of residence at the time of application. These 51 discharge rates, including Puerto Rico, will be tested for homogeneity, and if the rates are found to be essentially the same across all states, attrition probability over service time can be modeled irrespective of state of residence.

If attrition rates were found to be heterogeneous according to state of residence, we evaluate the effects of the demographic and other factors by state of residence to see if those factor effects may also be heterogeneous. Past studies have identified gender, age, race, education level, and AFQT score as some of the factors most strongly related to likelihood of early attrition. Implications of findings to future modeling of early military attrition will be discussed.

Homogeneity of attrition according to state of residence will be tested by a chi-square test. Applying a Cox proportional hazards model separately to the enlistees from each state, we also perform homogeneity tests for those individual factor effects. For any given factor, the homogeneity test statistic will be a measure of deviation of the coefficient values from each state-level model from the weighted average effect across all states.

A large value of the test statistic for a given factor implies that the effects of that factor show large variation from state to state, i.e., a heterogeneous effect.

Data on individuals entering service (gain data) during 1995–2002 and on those subsequently exiting service (loss data) were provided by DMDC. Data on all applicants for enlisted service, including demographic, academic, and state of residence, were provided by MEPCOM.

Results

Early attrition from each branch of service was found to be strongly heterogeneous according to the state of residence. For example, in the Army, the attrition rates were 13% for those from Rhode Island, Kentucky, and Arkansas, whereas attrition rates were only 6% for those from Hawaii and 6.5% for those from Alaska. More generally, it can be seen that attrition during the period studied was generally higher among enlistees from states in the East than among those from the West (Fig. 7).

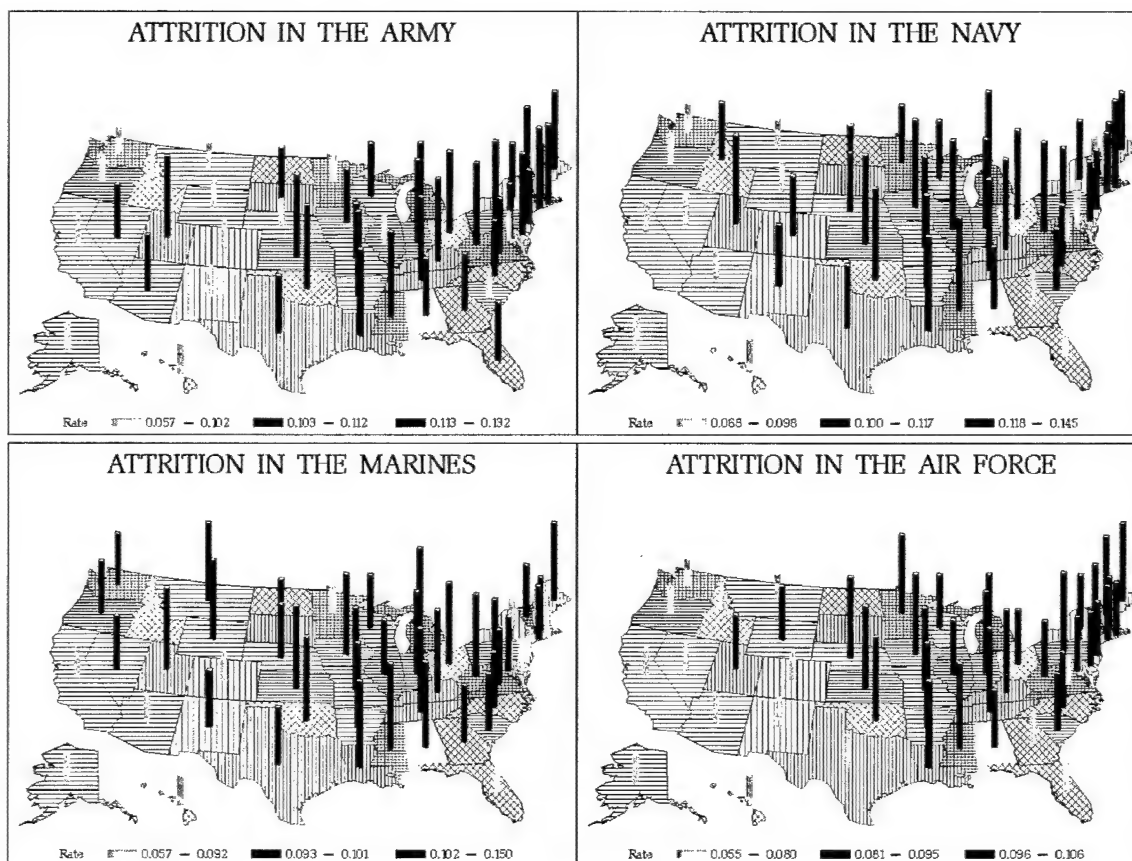


FIGURE 7. ATTRITION BY STATE OF RESIDENCE:

Given this strong difference in attrition observed by state of residence, it is of interest to examine if any of the previously identified factors related to attrition differ in their effects according to state of residence. Table 2 summarizes the factors examined and indicates those found to be significantly heterogeneous. Note the following:

1. Factors showing heterogeneous effects differ by service.
2. About two-thirds of the factors are homogeneous in all services.
3. Effect of a medical disqualification, either permanent or temporary, on likelihood of attrition does not differ geographically.

TABLE 2. HETEROGENEITY OF FACTOR EFFECTS ACCORDING TO STATE OF RESIDENCE

Factor	Army	Navy	Marines	Air Force
Gender	X		X	
Age	X			
White	X	X		X
Black		X		
No HS diploma		X		X
Dependents				
AFQT	X	X	X	X
Underweight		X		
Overweight	X			
Temporary DQ				
Permanent DQ				

Discussion

The likelihood of early attrition among active duty enlistees differs significantly according to state of residence. Visual inspection of attrition rates by state indicate that enlistees from western states have generally lower attrition likelihood than those from eastern states. Although some of these regional variations may be simply due to varying demographic factors by region that also are related to attrition likelihood, this study has found that the level of effects of several factors related to attrition differ by state.

Regarding medical disqualification, however, it is reassuring that the effect of temporary or permanent medical disqualification on likelihood of attrition does not differ geographically. This indicates that the application of medical standards, in conjunction with the subsequent medical waiver process, is geographically uniform. Those with a permanent medical failure had early attrition up to 30% higher than those without, and temporary medical disqualification was an even greater risk factor (data not shown).

Future modeling of attrition should account for those factors that show regional variation through the use of hierarchical models.

CASE SERIES REVIEWS

EPTS DISCHARGES FOR RETROPATELLAR PAIN SYNDROME IN 2001:

CASE SERIES REVIEW

Introduction

Retropatellar (patellofemoral) pain syndrome (RPPS) has been defined as “retropatellar or peripatellar pain resulting from physical and biochemical changes in the patellofemoral joint” [1]. In the general population, the syndrome is among the most common musculoskeletal complaints in all age groups [2] and has been estimated to account for 25–40% of all knee complaints seen in sports medicine clinics [3]. It occurs most frequently in adolescents and young adults and more frequently in females than males [3].

AMSARA examined EPTS discharges for RPPS because a significant number of recruits were discharged for orthopedic reasons in 2001. In 2001, 108 recruits received EPTS discharges for diagnosis of chronic RPPS (DoD Instruction code 717.7).

Methods

EPTS discharge records (DA4707, SF600, SF93, and SF88) received by MEPCOM with a primary or secondary diagnosis of RPPS, patellofemoral pain/joint syndrome, chondromalacia patella, or anterior knee pain were reviewed. All diagnoses were classified under DoD Instruction code 717.7 and were the sole basis of case selection. Cases included only active duty Army, Navy, Air Force, and Marine discharges during calendar year 2001. Gender, age, and race were not considered when defining the sample population. Cases were reviewed by a single, nonblinded reviewer using a standardized questionnaire. The same criteria were used to evaluate each case.

Results

In 2001, MEPCOM received EPTS discharge records for 108 recruits with primary or secondary diagnoses listed under DoD Instruction code 717.7. The distribution of these discharges by service is illustrated in Table 1, as is the distribution of all recruits who began active duty during 2001 for a rough basis of comparison. Although the Army clearly accounted for a disproportionately high percentage of these discharges, this does not necessarily reflect true differences among the services in likelihood of EPTS discharges for RPPS. The difference could be due to several factors, e.g., different reporting rates or discharge categorization across services.

TABLE 3. SERVICE DISTRIBUTION OF EPTS DISCHARGES FOR RPPS AND GENERAL ACCESSION POPULATION IN 2001

Service	EPTS cases (n = 108)		% Accessions (n = 169,778)
	No.	%	
Army	89	82.4	35.7
Navy	4	3.7	29.1
Air Force	6	5.6	17.0
Marines	9	8.3	18.3

Other demographic characteristics of the study population are listed in Table 4. Because of the low percentages for the Navy, Air Force, and Marines in this study, only the Army EPTS data were compared with the Army accessions data. A Z test for a single proportion is used to determine whether the proportion of EPTS discharges within a given demographic group is statistically different from the proportion of all incoming recruits (accessions) in that demographic group.

TABLE 4. DEMOGRAPHIC DISTRIBUTION OF ARMY EPTS DISCHARGES FOR RPPS AND ARMY GENERAL ACCESSION POPULATION IN 2001

Demographics	EPTS cases (n = 89)		% Accessions (n = 62,300)	p value (Z test)
	No.	%		
Age				
17–21 yr	58	65.2	74.9	0.03
22–25 yr	18	20.2	17.3	NS
26–29 yr	6	6.7	5.3	NS
>29 yr	7	7.9	2.5	<0.01
Gender				
Male	69	77.5	80.0	NS
Female	20	22.5	20.0	
Race				
White	72	81.8	63.0	<0.01
Black	9	10.2	20.6	<0.02
Other	7	8.0	16.4	<0.05

Body mass index (BMI) was calculated from height and weight data obtained from the MEPS physical exam according to the following equation: BMI = weight (in pounds) ÷ height squared (in inches) × 703. Calculated BMI was placed into categories using the 1998 National Institutes of Health BMI criteria (Table 5). Data from all four services are included in the results.

TABLE 5. BMI DISTRIBUTION OF EPTS DISCHARGES FOR RPPS AT MEPS IN 2001

Total analyzed (n = 107)	Males (n = 84)		Females (n = 23)	
	No.	%	No.	%
Underweight (<18.5)	4	4.8	1	4.3
Normal (18.5–24.9)	36	42.9	16	69.6
Overweight (25.0–29.9)	27	32.1	5	21.7
Obese I (30.0–34.9)	16	19.0	1	4.3
Obese II (35.0–39.9)	1	1.2	0	0
Obese III (>40.0)	0	0	0	0

Pes planus (flatfoot) and pes cavus (high-arched foot) have been cited in the literature as risk factors for patellofemoral pain syndrome. Information about both conditions was included in this study (Table 6).

TABLE 6. PES PLANUS OR PES CAVUS IN EPTS DISCHARGES FOR RPPS IN 2001

Condition	Total cases (n = 108)	
	No.	%
Pes planus	20	18.5
Pes cavus	4	3.7
Neither pes planus or cavus	80	74.1
Unknown	4	3.7

Of the 108 recruits in this study, 18 reported a history of knee problems at the MEPS. However, only 14 of these recruits were further questioned or evaluated to assess the significance of the knee problems. The other four recruits had no documentation to indicate that their knee was evaluated or that they were questioned further.

Sixty-one of the 108 recruits (56%) received at least one knee imaging study as part of their workup at the troop medical clinic (TMC). Twenty-six of these 61 recruits (43%) had an abnormal finding that could at least partially explain their knee pain. Abnormalities included bone deformities, stress fractures, stress reactions, early osteoarthritis, and chondromalacia patella. These 61 recruits received a total of 72 imaging

studies; 11 of these recruits had two different imaging studies performed. Table 7 lists the types and numbers of studies.

TABLE 7. NUMBER OF IMAGING STUDIES PERFORMED AT TMC

Imaging study	No.
X-rays	57
Bone scan	11
Magnetic resonance imaging	3
Arthroscopy	1
Total	72

Based on the EPTS discharge records, TMC physicians either commented that a recruit admitted to having a history of a knee problem, injury, or surgery before accession or did not mention such a history. If the recruit reported the history to the TMC physician but did not mention it in the MEPS history and physical, then this review considered evidence of concealment (regardless of whether it was intentional). If the recruit reported a knee problem at the MEPS or if the recruit stated at the TMC that he or she never had knee problems before entrance on active duty, then no evidence of concealment was considered. An estimated 63.0% of the cases exhibited evidence of concealment (Table 8).

TABLE 8. CONCEALMENT OF HISTORY OF RPPS

Status	Total cases (n = 108)	
	No.	%
Concealment	68	63.0
No concealment	36	33.3
Unknown	4	3.7

Various treatment plans were employed for recruits with RPPS, as summarized in Table 9. Double therapy typically consisted of rest and duty restriction profile plus either nonsteroidal anti-inflammatory drugs (NSAID) or physical therapy. Triple therapy typically consisted of all three treatments.

TABLE 9. PERCENTAGE OF RECRUITS TREATED AT TMC FOR RPPS

Type of treatment	%
No treatment	24.1
Only physical therapy	3.7
Only rest/profile	45.9
Double therapy	22.2
Triple therapy	22.2

Discussion

In 2001, those recruits receiving EPTS discharge for RPPS (DoD Instruction code 717.7) did not represent the general accessions population. Compared with accessions data, Army recruits had EPTS discharges for RPPS in higher proportions than expected, whereas Navy, Air Force, and Marine discharges had proportions that were lower than expected. If this finding is not a result of a reporting bias, there may be an opportunity to make changes in the initial training at Army BCT sites to reduce morbidity among those at high risk of RPPS.

The literature indicates that there should have been a predominance of females with RPPS [4]. However, no data were found regarding the actual ratio of females to males. Although females were over-represented among cases, this finding was not statistically most likely due to the small sample size of this study.

Based on at least one report [4], a higher percentage of RPPS should have been found among adolescents and young adults. In contrast, this study revealed a lower percentage of EPTS discharges for RPPS in recruits aged 17–21 years in comparison with overall accessions. Surprisingly, there was also a higher percentage than expected in those recruits aged ≥ 30 years. Perhaps this can be explained by the fact that our

study only analyzes recruits who received EPTS discharges for RPPS and not the prevalence of RPPS in all recruits.

In contrast to the literature, which indicates that RPPS has no race predilection [4], white recruits had a much higher proportion of EPTS discharges for RPPS compared to blacks or "other race" recruits. It should be noted that EPTS discharges are more common among whites across all medical conditions. Thus the racial difference seen for this disorder may be due in part to socio-economic pressures that vary by racial groups in the United States.

Overload is considered a risk factor in the pathogenesis of RPPS [4]. Therefore, the finding that 52% of males and 26% of females in this study were overweight or obese was somewhat expected.

With respect to concealment, 63% of the recruits concealed their knee problem history, and 22% of those who did not conceal were *not* evaluated further or even questioned about their history of knee problems. These two findings suggest that the MEPS history and physical has a low sensitivity for detecting recruits with RPPS. This low sensitivity is not surprising and has been found to also be the case in other military forces. For example, the Australian Army conducted a study to determine if the orthopedic screen was valuable in predicting subsequent occurrences of injury or medical discharge in their recruits. This study concluded that the orthopedic screen was ineffective, particularly because recruits can withhold information about preexisting conditions, making detection difficult [5].

In regard to imaging studies, 56% of the recruits had at least one imaging study at the TMC, and 43% of these recruits had an abnormal knee finding that could account for their knee pain. Because most of these imaging studies were plain films (79%), which have low sensitivity for finding abnormalities in soft tissue and cartilage, a lower percentage of abnormal results was expected. It is unclear from this review whether the plain film and bone scan findings were specific for RPPS.

Limitations

This review has a several limitations. The first is that reporting of EPTS discharges to MEPCOM is voluntary. Thus, not all EPTS discharges for RPPS may have been reported. For example, the low percentage of Navy, Marine, and Air Force discharges made it impossible to generalize our findings to all services. The low percentage also makes it difficult to determine if there is a true decrease in prevalence of RPPS in the Navy, Marines, and Air Force (perhaps because intense training involving the knees is less), or if the difference is due to lack of reporting by services other than the Army. Other limitations are lack of standardization in reporting and/or poor documentation. These make it difficult to determine which week each recruit first presented to the TMC, what type of MEPS evaluation was conducted if a recruit reported a history of knee problems, and what treatment(s) were administered at IET.

Another limitation is that although some history and physical examination findings support the diagnosis of RPPS, there are no specific diagnostic criteria. For example, the only information about RPPS in DoD Instruction 6130.4 is as follows: "Chronic RPPS with or without confirmatory arthroscopic evaluation" is disqualifying for service. Clarifying DoD Instruction 6130.4 (e.g., defining "chronic") would help MEPS and IET physicians, particularly in terms of the duration of the condition and whether only the current diagnosis or history is disqualifying. In addition, defining the severity of RPPS that is disqualifying in terms of level of activity would help physicians apply the standard uniformly.

Recommendations

Two recommendations emerge from this review. First, conduct a survival analysis to assess the long-term outcome of recruits who received a waiver for RPPS compared with a control group of recruits who did not require a waiver. Follow-up would be necessary to determine what percentage of these recruits can complete IET and their enlistment obligation. Second, improve MEPS screening by including a functional test to gauge baseline fitness before accession. Perhaps a modified fitness test would be appropriate. A modified test might also have the added benefit of forcing recruits to train on their own before accession so they would be better prepared for the rigors of IET.

Acknowledgments

AMSARA thanks 2LT Michael Licata MS IV, Uniformed Services University of Health Sciences

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EPTS DISCHARGES FOR HYPERTENSION IN 1999–2001: CASE SERIES REVIEW

Introduction

In 2002, the National Center for Health Statistics estimated that the prevalence of hypertension in young adults (age 20–34 years) in the general U.S. population was about 9% for males and 3% for females. These estimates were based on revised cutoff values set forth in guidelines released in May 2003 by the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7). Among the key changes were the addition of a prehypertensive category and the combination of the former stage II and stage III hypertension categories. The report defined the categories by using the following parameters for systolic and diastolic blood pressures:

Normal blood pressure

Systolic <120 mmHg and diastolic <80 mmHg

Prehypertensive

Systolic 120–139 mmHg or diastolic 80–89 mmHg.

Stage I hypertension

Systolic 140–159 mmHg or diastolic 90–99 mmHg

Stage II hypertension

Systolic ≥160 mmHg or diastolic ≥100 mmHg

DoD Instruction 6130.4 defines hypertensive vascular disease (ICD9 code 401) as such disease evidenced by the average of three consecutive systolic or diastolic measurements that fall within the stage I or stage II categories as defined by JNC 7. The instruction also includes high blood pressure that requires or has required medical treatment or dietary restriction. A descriptive analysis of EPTS discharges for hypertension among first-time, active duty enlistees in the Army, Navy, Marines, Air Force, and Coast Guard follows.

Methods

Records of EPTS discharges from 1999–2001 for hypertension as the primary diagnosis (ICD9 code 401) were examined. One hundred-sixty four active duty personnel in the five services were identified as cases.

Demographic and physical condition data were extracted from hard copies of the case records. Variables included height, weight, blood pressure assessed at MEPS and IET, history of hypertension, history of hypertension medication, waiver status, concealment of hypertension, and discharge status. This study summarizes these data by year and service. All subjects in the Air Force, Navy, Marines, and Coast Guard were male, and 10% of the cases in the Army were female.

Results

History of Disease and Medication

Data concerning hypertension, medication history, waiver status, and concealment are presented in Table 10. Approximately 25% (Marines and Coast Guard) to 50% (Army, Air Force, and Navy) of the discharges had a pre-IET history of hypertension. When examined by year, 48% of EPTS discharges in 1999 were associated with a pre-IET history of hypertension. In 2000 and 2001, the percentage of cases with a history of hypertension was approximately 35 and 36%, respectively. The proportion of cases with a history of medication for hypertension before the MEPS physical was approximately 9% in the Marines and 20% in the Army and Navy. When examining the history of treatment for hypertension by study year, about 23% of subjects had taken hypertension medication before MEPS in 1999. This figure dropped to 15% in 2000 and 12% in 2001.

TABLE 10. FIRST-TIME ACTIVE DUTY RECRUITS WITH EPTS DISCHARGE FOR HYPERTENSION: 1999–2001*

Year	Male		Pre-IET history of hypertension		Pre-IET history of medication		Medication received at IET		Concealed		Waived	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1999 (n = 52)	48	92.2	25	48.1	12	23.1	13	25.0	18	34.6	11	21.2
2000 (n = 46)	46	100.0	16	34.8	7	15.2	13	28.3	12	26.1	3	6.5
2001 (n = 66)	64	97.0	24	36.4	8	12.1	19	28.8	12	18.2	9	13.6
Total: n = 164	158	96.3	65	39.6	27	16.5	45	27.4	42	25.6	23	15.2

* Columns represent nonmutually exclusive categories; therefore only column totals are relevant. Row totals presented are the number of subjects studied by service or by year.

The percentage of cases receiving medication at IET differed among services but not between study years. In 1999–2001, typically 25–29% of recruits received medical treatment for hypertension during IET. When summarizing the 1999–2001 data by service, it was found that the proportion of cases in the Army, Navy, and Marines treated for hypertension at IET was about 28%, 37%, and 18%, respectively. In total, out of 65 recruits with a pre-IET history of hypertension, 27 (42%) also had a pre-IET history of medical treatment.

Given the fact that medical history is either obtained via self-report or through reviews of civilian records, this figure of 42% should be considered an underestimate.

Waivers

Three percent of Marine discharges for hypertension had received a waiver for hypertension, whereas nearly 15% of Army and Navy cases received waivers for hypertension. Across study years, the proportion of hypertensive recruits waived for hypertension was 21% in 1999, about 7% in 2000, and 14% in 2001. Table 1 presents these data in more depth.

Concealment

Thirty-five percent of discharges had a previously undisclosed history of hypertension in 1999. That proportion dropped to 26% in 2000 and to 18% in 2001. Upon examination of concealment across services, it was found that nearly 40% of hypertension EPTS discharges in the Army failed to report a history of hypertension. Nearly 26% of cases in the Navy and 12% in the Marines concealed their disease status. Table 11 presents these data in more depth. Those recruits without evidence of concealment either had new-onset hypertension, previously undiagnosed hypertension, or were untruthful about their hypertension but were not verified as untruthful.

Hypertension at MEPS¹

At MEPS, between 5% and 9% of the cases studied across services had normal blood pressures according to JNC 7 classifications. The percentage of prehypertensive recruits was 56% in the Marines, 37% in the Navy, and 36% in the Army. Of the cases studied, 44% of Army recruits, 37% of Navy recruits, and 35% of Marine recruits had stage I hypertension at MEPS. The percentage of recruits by service with stage II hypertension was 20% in the Navy, 13% in the Army, and 3% in the Marines. Looking across study years, the proportions of subjects in each category were fairly similar between 1999 and 2001, except for stage II hypertension in 2000. The percentage of stage II hypertension cases was much lower in 2000 compared with 1999 or 2001. In total, 88 of the 164 recruits studied (54%) had blood pressures recorded at MEPS that were in the range of stage I or stage II hypertension (Table 11).

TABLE 11. HYPERTENSION STATUS AT MEPS FOR FIRST-TIME ACTIVE DUTY RECRUITS WITH AN EPTS DISCHARGE FOR HYPERTENSION: 1999–2001*

Year	Normal		Prehypertensive		Hypertensive			
	%	No.	%	No.	Stage I		Stage II	
1999 (n = 52)	5.8	3	40.4	21	34.6	18	19.2	10
2000 (n = 46)	8.7	4	39.1	18	47.8	22	4.4	2
2001 (n = 66)	6.1	4	39.4	26	40.9	27	13.6	9
Total: n = 164	6.7	11	39.6	65	40.9	67	12.8	21

* Normal: systolic <120 mmHg and diastolic <80. Prehypertensive: systolic 120–139 mmHg or diastolic 80–89 mmHg. Stage I: systolic 140–159 mmHg or diastolic 90–99. Stage II: systolic ≥160 mmHg or diastolic ≥100 mmHg.

Hypertension at Discharge

Upon examination of hypertension status at IET, the proportions of subjects in the four JNC 7 categories were stable over the three years. In general, approximately 2% were normal, 13–14% were prehypertensive, 33–51% were stage I, and 41–50% were stage II. The proportions of subjects in the four JNC 7 hypertension categories differed markedly between services. Excluding the Air Force and Coast Guard, most Marine and Navy subjects were stage I hypertensives, whereas most Army subjects were stage II. In total, the blood pressure of 134 of 151 of the recruits (89%) fell in the range of stage I or stage II hypertension. It appears that the proportion of recruits with stage I and stage II hypertension increased

between MEPS and discharge at IET. This may have resulted from several factors, including stress and cessation of undisclosed medication (Table 12).

TABLE 12. HYPERTENSION STATUS AT IET FOR FIRST-TIME ACTIVE DUTY RECRUITS WITH AN EPTS DISCHARGE FOR HYPERTENSION: 1999–2001*

Year	Normal		Prehypertensive		Hypertensive			
					Stage I		Stage II	
	%	No.	%	No.	%	No.	%	No.
1999 (n = 46)†	2.2	1	13.0	6	43.5	20	41.3	19
2000 (n = 42)§	2.4	1	14.3	6	33.3	14	50.0	21
2001 (n = 63)‡	1.6	1	3.2	2	50.8	32	44.4	28
Total: n = 151	2.0	3	9.3	14	43.7	66	45.0	68

* Normal: systolic <120 mmHg and diastolic < 80. Prehypertensive: systolic 120–139 mmHg or diastolic 80–89 mmHg. Stage I: systolic 140–159 mmHg or diastolic 90–99. Stage II: systolic ≥160 mmHg or diastolic ≥100 mmHg.

† Six subjects did not have blood pressure on record at IET.

§ Four subjects did not have blood pressure on record at IET.

‡ Three subjects did not have blood pressure on record at IET.

Body Mass Index

BMI was calculated as the quotient of mass (kg) and height² (m²). Virtually none of the subjects fell into the underweight category in any study year. About 23% (1999) to 35% (2000) fell into the normal range. Most subjects, nearly half in all study years, were in the overweight category. Furthermore, about 20% of subjects in all study years were obese. Nearly the same pattern was observed when examining these data by service. Table 13 presents these data in greater detail.

TABLE 13. BODY MASS INDEX AT MEPS FOR FIRST-TIME ACTIVE DUTY RECRUITS WITH AN EPTS DISCHARGE FOR HYPERTENSION: 1999–2001*

Year	Underweight		Normal		Overweight		Obese	
	No.	%	No.	%	No.	%	No.	%
1999 (n = 52)	0	0.0	12	23.1	29	55.8	11	21.2
2000 (n = 46)	0	0.0	16	34.8	19	41.3	11	23.9
2001 (n = 66)	2	3.0	18	27.3	34	51.5	12	18.2
Total: n = 164	2	1.2	46	28.0	82	50.0	34	20.7

* Underweight: BMI <18.5; normal: BMI 18.5–24.9; overweight: BMI 25–29.9; obese: BMI ≥30.

Discussion

Of the Army, Navy, and Marines, the Marines had the lowest proportions of discharged recruits with disclosed or concealed histories of hypertension and medication before MEPS. Not unexpectedly, the Marines also had the lowest percentage of discharged recruits who received waivers for hypertension. Furthermore, according to JNC 7 criteria, the Marines had the lowest proportion of hypertensive recruits at MEPS and at IET. However, the percentage of Marine recruits considered to be obese was similar to the percentage in the Army and the Navy. Interestingly, 22–24% of all subjects in this study were considered obese, whereas in the general recruit population at MEPS in 1999–2001, the percentage of obese recruits was 4–7%.

This study suggests that most people who were given an EPTS discharge with hypertension did not receive a waiver for hypertension. However, these data must be interpreted cautiously because no control group was examined. For example, it is not reported how many individuals received a waiver for hypertension, so although there is an indication of failure for waived recruits, there is no indication of success for that same group.

Another limitation is the fact that 7.9% (13/164) of EPTS discharges did not have a blood pressure recorded at IET. This is cause for some alarm because all discharges in this study were made on the basis for hypertension. Furthermore, a few ($n = 3$) hypertension-related EPTS discharges were actually normotensive at the time of discharge. This may question the basis for discharge in those cases. A related complication is that blood pressure screening is not universal at many IET sites, which means there may be a risk for underreporting of hypertension. Although further in-depth analysis is needed, and despite the limitations of this study, it appears that the waiver criteria for hypertension are adequate, especially for the Marines, where only three hypertension EPTS discharges had been waived for hypertension.

Finally, according to BMI values, approximately 103 of 164 of the EPTS discharges for hypertension (63%) were either overweight or obese. It is assumed that all hypertension discharges at least received recommendations for lifestyle modifications, including dietary restrictions and exercise. Given that 148,094 of 389,722 recruits between 1998 and 2001 were overweight or obese, a rough odds ratio was calculated. It was found that the odds of receiving some type of treatment for hypertension was 3.7 times greater in overweight or obese individuals than the odds for individuals who were in the underweight or normal weight categories. This point estimate must be interpreted with caution, however.

First, the figures for the reference group (first-time enlistees who did not receive a discharge for hypertension) are from 1998–2000, whereas those for the cases (hypertension EPTS discharges among first-time enlistees) are from 1999–2001. As long as the proportions of obese enlistees in 1998 and 2001 were similar to those found for 1999 and 2000, this should not greatly affect the odds ratio. Given the data in Table 13, it appears that the proportion of overweight and obese recruits was fairly stable over time. Second, MEPS data are actively collected by AMSARA, whereas EPTS data are not. Consequently, the number of hypertension EPTS discharges may be underestimated. If the proportion of unreported hypertension EPTS discharges is assumed to be the same for underweight/normal weight individuals and for overweight and obese individuals, then the odds ratio should not be greatly affected. Unfortunately, no data are available to indicate the completeness of EPTS data or the equity of reporting across BMI categories. Despite these limitations, it is strongly suggested that individuals who are overweight or obese have greater odds for requiring treatment of hypertension via medication or lifestyle modification.

EPTS DISCHARGES FOR PES PLANUS IN 2001: CASE SERIES REVIEW

Introduction

Pes planus (flatfoot) consists of a constellation of physical features that includes excessive eversion of the subtalar complex during weightbearing with plantarflexion of the talus, plantarflexion of the calcaneus in relation to the tibia, a dorsiflexed and abducted navicular, a supinated forefoot, and valgus posture of the heel. The lateral border of the foot is short compared with the medial border, which creates midfoot sag and a lowering of the medial longitudinal arch. Because there is no standard that defines what degree of loss of the medial longitudinal arch constitutes pes planus, differentiating normal from abnormal feet is difficult. For the same reason, comparing the results of different studies on pes planus is difficult [1, 2].

Functional tests (e.g., observing whether the arch reforms when the patient stands on tiptoe and performing active and passive dorsiflexion of the metatarsophalangeal joint to determine arch height) should be conducted [1, 3, 4]. To quantitatively evaluate the severity of pes planus, standing anteroposterior and lateral x-rays as well as nonstanding lateral oblique x-rays should be taken. This combination of views

shows the amount of talocalcaneal divergence on an anteroposterior view and the amount of plantarflexion of the talus on the lateral view [2]. Results of the history and physical exam should allow the physician to quantify pes planus as flexible or rigid.

Pes planus in adults and children is usually flexible, meaning that the arch will appear normal when the patient is not bearing weight [2]. Flexible pes planus is a physiologic condition and is often seen in individuals who have joint laxity. It is seen in healthy individuals and rarely causes disability or requires treatment, although overuse may cause pain [1, 4].

If the arch does not appear normal when not bearing weight, then the pes planus is classified as rigid [2, 3]. Rigid pes planus is a pathologic condition and often occurs in conjunction with an underlying disease. It can be divided into congenital and acquired forms. Causes of rigid pes planus include structural abnormalities (e.g., vertical talus and tarsal coalition), collagen disorders (e.g., Marfan syndrome), musculoskeletal abnormalities (e.g., weak posterior tibial muscles or tight calcaneal tendon), trauma (e.g., interarticular fractures or tendon lacerations), spastic conditions (e.g., arthritis of talocalcaneal joint as seen in juvenile rheumatoid arthritis), or neuromuscular conditions (e.g., cerebral palsy or meningocele) [1, 4].

Pes planus is a normal condition in infancy, and the arch develops gradually during childhood. Thus, pes planus is normal in infants, common in children, and often present in adults. Its prevalence decreases with age [1]. Estimates on the prevalence range from 1.8% of the adult population to 23% [1, 2, 5].

DoD Directive 6130.4 states that symptomatic pes planus is disqualifying for service under the following conditions: acquired (ICD9 code 734), congenital (ICD9 code 754.6), or a pronounced case with absence of subtalar motion

Methods

EPTS discharge records (DA4707, SF600, SF93, and SF88) from January 2001 to December 2001 received by MEPCOM that had a primary or secondary diagnosis of pes planus (ICD9 code 754.6) were reviewed. (No cases with ICD9 code 734 were noted during this period.) Cases were limited to active duty Army, Navy, Air Force, Marine, and Coast Guard enlistees discharged during calendar year 2001.

Cases were selected solely on the basis of having ICD9 code 754.6. Age and gender were not considered when defining the sample population. Cases were reviewed by one nonblinded reviewer using a standardized questionnaire. Variables were divided into three domains.

1. Demographics: service, EPTS discharge type, gender, age, race, and BMI.
2. MEPS history and physical: did recruit self-report pes planus to MEPS, did MEPS physician find pes planus on physical exam, what was the grade of pes planus at MEPS, and were x-rays taken at MEPS?
3. TMC visit: first presentation of recruit to TMC, total number of recruit visits to TMC, consults that were performed at TMC, additional diagnoses made at TMC, change in grade of pes planus from MEPS to TMC, concealment by recruit of symptomatic pes planus, and treatment given.

Variables were selected based on review of the literature and review of a small sample of EPTS records for pes planus. Each case was evaluated using the same criteria.

Results

In 2001, MEPCOM received EPTS discharge records for pes planus on 202 recruits; 171 had a primary diagnosis of pes planus and 31 had a secondary diagnosis. Demographics are presented in Table 14.

TABLE 14. DEMOGRAPHIC DISTRIBUTION OF EPTS PES PLANUS DISCHARGES AND GENERAL ACCESSION POPULATION: 2001

Demographic	EPTS cases (n = 202)		% Accessions (n = 169,795)	p value (chi-square)
	No.	%		
Service				
Army	126	62.4	35.7	0.000
Navy	46	22.8	29.1	0.049
Air Force	13	6.4	18.8	0.980
Marines	16	7.9	18.3	0.987
Coast Guard	2	1.0	*	*
Gender				
Male	157	77.7	82.0	0.123
Female	45	22.3	18.0	0.999
Age				
17-20	149	73.8	73.5	0.933
21-25	41	20.2	21.2	0.754
26-30	11	5.5	4.2	0.376
>30	1	0.5	1.1	0.411
Race				
White	91	45.1	70.8	0.000
Black	80	39.6	18.6	0.000
Other	31	15.3	6.6	0.000

*Data for Coast Guard unavailable.

MEPCOM classifies EPTS discharges according to the facts of each case. Figure 8 summarizes pes planus EPTS discharges by type.

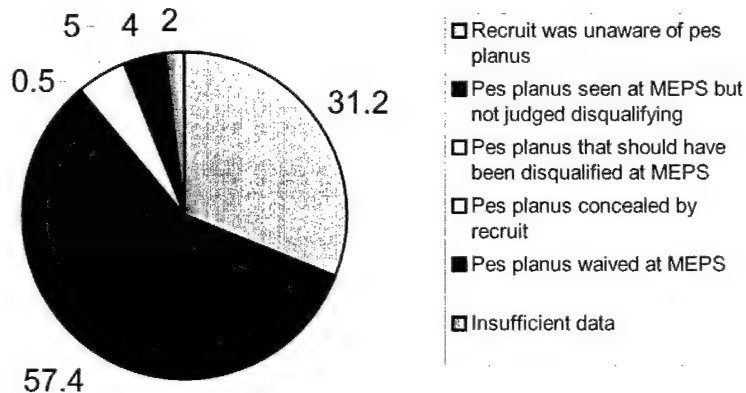


FIGURE 8 . PERCENT OF OVERALL RECRUITS BY MEPCOM EPTS TYPE.

Pes planus is graded on physical exam at MEPS. The standard MEPS physical exam form grades pes planus as mild, moderate, or severe. The condition is then further graded as symptomatic or asymptomatic. The physician circles the preprinted grade on the form. During this review, AMSARA found 36 males and 15 females who had pes planus that had been missed at MEPS. Table 15 summarizes the grading of pes planus by MEPS physicians.

TABLE 15. PES PLANUS GRADE AT MEPS

Total analyzed (n = 202)	Males (n = 157)		Females (n = 45)	
	No.	%	No.	%
Mild	62	39.5	17	37.8
Moderate	47	30.0	12	26.7
Severe	12	7.7	1	2.2
Total pes planus found at MEPS	121	77.1	30	66.7
Total pes planus <i>not</i> found at MEPS	36	22.9	15	33.3
Symptomatic	3	2.0	0	0
Asymptomatic	117	74.5	30	66.7
Not applicable	37	23.6	15	33.3

The manner in which a recruit was treated for pes planus was obtained by reviewing medical records. Because data are collected differently between posts, data were unavailable for all recruits. For recruits who received two treatments, the most common combination was inserts plus NSAIDs. For recruits who received three treatments, the most common combination was inserts plus NSAIDs plus profile. For recruits who received four treatments, the most common combination was inserts plus NSAIDs plus physical therapy plus profile. Figure 9 summarizes the treatments of pes planus.

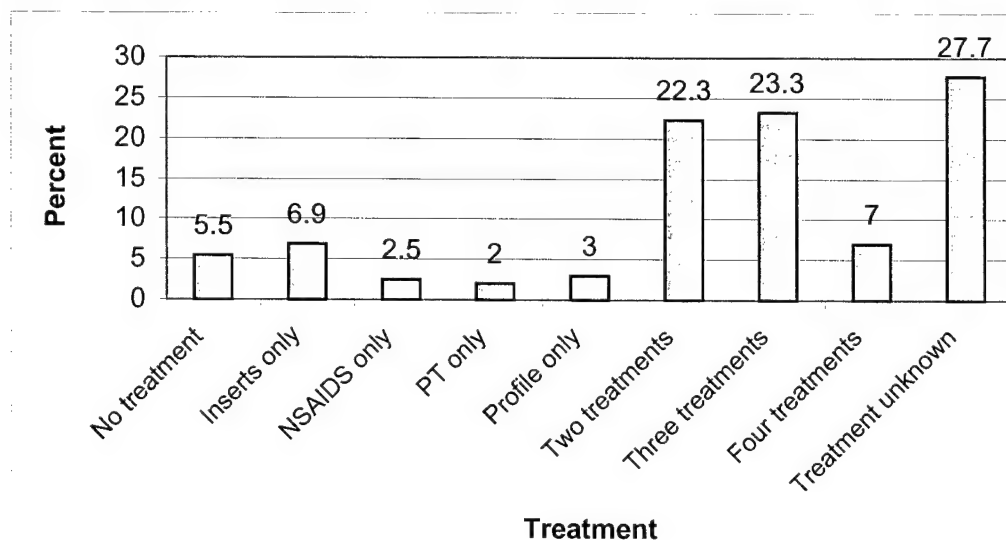


FIGURE 9. TREATMENT FOR PES PLANUS AT TMC (N = 202). PT, PHYSICAL THERAPY.

Discussion

Recruits receiving EPTS discharges for pes planus did not represent the general recruit population. Recruits in the Army and Navy have EPTS discharges for pes planus in higher proportions than expected. Whites have EPTS discharges for pes planus in lower proportions than expected, and nonwhites have EPTS discharges for pes planus in higher proportions than expected.

The MEPS history and physical did not identify all recruits with pes planus: 36 males and 15 females (33% of the population) were diagnosed with normal arches during the MEPS physical and were later found to have preexisting pes planus at the TMC. Thus, the MEPS exam has a low sensitivity.

Studies conducted by the Australian Army conclude that orthopedic screen had no value in predicting the subsequent occurrence of injury or medical discharge in its recruits. They further conclude that if a recruit withholds information about a preexisting condition, detecting the condition during a screening exam is nearly impossible [6]. Data from this study agree with these conclusions.

Most recruits did not report any lower extremity problems except foot pain. This agrees with both the civilian and military studies that found no association between pes planus and lower extremity injury. The literature suggests that foot pain may only be part of the reason recruits receive an EPTS discharge for symptomatic pes planus. The studies by the Australian Army may again be relevant. If Australian Army recruits were aware of the fact that if they had a preexisting condition, they would be discharged quickly. The study concluded that many recruits who failed to adapt to a military lifestyle may have feigned injury to get out of the military [6]. Similarly, the data from this study suggest that recruits may be using symptomatic pes planus to gain discharge. However, more data are needed for confirmation, e.g., amount of foot pain a recruit feels and the recruit's motivation to train.

Limitations

This review has several limitations. First, reporting of EPTS discharges to MEPCOM is voluntary. Consequently, not all EPTS discharges for pes planus may have been reported.

Second, reporting is not standardized among IET sites. The records available for each recruit varied depending on the site at which the recruit was stationed. Some posts do not include the medical records from the TMC and only summarize the recruit's discharge and history and physical form from MEPS. This factor limited analysis of several variables, including whether the recruit had a past history of exercise, what week the recruit first presented to the TMC, total visits the recruit made to the TMC, whether the grade of pes planus changed from the grade assigned at MEPS, and whether the recruit concealed a history of pes planus.

Third, the grading of pes planus is not standardized. Because no standard exists, physicians use their clinical judgment to evaluate the grade, so the inter-rater reliability is low [7].

Fourth, the MEPS physical exam form does not address whether the recruit has flexible or rigid pes planus. This distinction is important, because rigid pes planus is more likely to be symptomatic and to cause problems for a recruit.

Recommendations

All MEPS stations should adopt a standard method for evaluating and grading pes planus. Standardization would reduce the variability in grading and ensure that all recruits are uniformly classified.

The MEPS physical exam should differentiate between flexible and rigid pes planus. This can be accomplished by conducting functional tests such as observing the arch when the patient stands on tiptoe and performing active and passive dorsiflexion of the metatarsophalangeal joint. These tests can be conducted with minimal added time and cost of the exam.

Finally, the fitness and motivation level of recruits with pes planus should be assessed. A recruit with pes planus who has a history of exercise (e.g., running cross-country or track) with no symptoms is more likely to remain asymptomatic during basic training. Similarly, recruits who are motivated to train are more likely to complete basic training, even if they are experiencing symptoms.

Acknowledgement

AMSARA thanks 2LT John Yasmer, MS III, Western University of Health Sciences

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EPTS DISCHARGES FOR HEADACHE IN 2001: CASE SERIES REVIEW

Introduction

Headache is a complex entity to characterize because the experience is subjective. Most types are difficult to qualify or quantify with objective measures, such as lab values and imaging [1], and it is also a symptom of various neurobiological derangements [2, 3]. Nevertheless, primary headaches, or those not stemming from other initial pathology, are a described and legitimate disorder [4].

In the United States, most headaches are primary, and the three most common types of primary headache are tension, migraine, and cluster [2, 5]. Although widely disparate data are available, a reasonable prevalence estimate for any year-period from a series of studies in the 1990s follows. The prevalence for one or more migraine headaches is 17.6% of U.S. females and 5.7% of U.S. males [6]. Chronic tension headaches affect 2.2% of the population, and episodic tension headaches occurred in 38.3% of the population [7]. Less information is available on cluster headaches, although a well-constructed survey of more than 26,000 Italians suggests a prevalence of 0.056% [8]. In this study, incidence was at a rate of 2.5/100,000/year, which differs slightly from a 1994 U.S. incidence study of more than 6,400 records describing a rate of 15.6/100,000 persons/year for males and 4.0/100,000 persons/year for females [9]. Care must be taken when interpreting this type of data, however, because other sources describe differing prevalence values and because studies that further classify headache sufferers note variability across demographics for race, socioeconomic status, education, age, and gender for many headache types [6, 7].

A 2000 longitudinal study of nearly 6,100 U.S. adolescents showed that approximately 37.6% of girls and 21.3% of boys had recurrent headaches within 12 months [10]. This fact may be relevant to the military recruit pool, the age of which is similar.

The ICD9 classifies headaches under code 784 (recurrent headaches of all types) or as one of the following subtypes: dependence on headache powder (304.6), tension headache (307.81), vascular headache (346), migraine headache with aura (346.00), sick headache (346.1), migraine headache without aura (346.10), intractable common migraine headache (346.11), menstrual migraine headaches (346.2), vasomotor headache (346.9), intractable migraine headache (346.91), post-lumbar puncture headache (349.0), menopausal headache (627.2), and post-lumbar puncture chronic headache (E879.4) [11]. Literature suggests cluster headache is the third most prevalent headache type. This suggestion is difficult to interpret using ICD9 codes, which lump cluster headache under the general 784 code. Migraine, however, is split into five different codes, reflecting the variability among migraine symptoms.

DoD Instruction 6130.4 defines a disqualifying headache as follows. Recurrent headaches are headaches of all types of sufficient severity or frequency as to interfere with normal function in the past 3 years [11]. This definition classifies headache in terms of functional deficit rather than by headache etiology or

treatment modality. Such a classification scheme is consistent with the DoD approach to use headache as an exclusionary criterion for military service.

For this analysis, factors considered from the MEPS exam and other records will be based on biological plausibility (e.g., history of brain tumor, history of head injury, etc.) and the literature cited above (e.g., association of certain headaches with smoking [9], gender, etc.).

This case series review will describe recruits who were discharged for EPTS headache disorder but who passed through the MEPS without the condition being detected. Current problems in generating information at the MEPS and suggestions for improved screening will be discussed.

Methods

The study is a retrospective, descriptive case series review of a population of 117 recruits discharged from the military for EPTS headache disorders. All 117 records were available, but it is unclear what percentage of total EPTS headache separations they represent. Records are from active duty Army, Navy, Air Force, Marine, and Coast Guard recruits discharged for EPTS headache in 2001. Diagnoses were primary or secondary for headache (ICD9 code 784). All materials in the EPTS packets provided to MEPCOM were reviewed, including the initial MEPS questionnaire and history and physical (SF88 and SF93), the primary physicians' diagnosis and treatment notes (SF600), documents concerning the separation process (DA4707 and DA3947), and any ancillary paperwork such as recruiter allegation statements (utilized predominantly by the Marine Corps), specialist consults, administrative counseling forms, etc.

Data extracted included demographics and information from the following five general domains: 1) evidence of disclosure/concealment of known headache condition, 2) recruit lifestyle attributes (e.g., smoking, alcohol abuse, and/or drug use), 3) recruit physical attributes, 4) MEPS physical/qualification/waiver process, and 5) medical evaluation and EPTS separation process. Data were then input into an Excel spreadsheet, and descriptive analysis was performed using Excel.

Concealment of the headache condition was classified by MEPCOM under the "EPTS type" category. In this variable, EPTS was assigned one of six categories: A) recruit had no prior knowledge of disease state, B) MEPS examiners used sound clinical judgment to override a potentially disqualifying condition, C) disease state should have been discovered and recruit disqualified at MEPS, D) condition was actively concealed by recruit, E) condition led to disqualification and a waiver was granted, and W) incomplete data.

Records were reviewed for evidence of concealment by using two items on the data extraction sheet. Item one pertained to point-of-entry disclosure of a headache or profound neuropsychiatric condition and was scored "yes" or "no." "Yes" meant that either the recruit answered one of the headache items on the MEPS

questionnaire or had a headache history discovered during the MEPS examination. Item two concerned whether a headache condition was determined to exist after the individual had presented for healthcare and had been examined. "Yes" meant a positive in-training diagnosis for headache. If these two items were concordant, no concealment was judged to have occurred. If the items were discordant, the record was reviewed a second time to determine if there appeared to be prior knowledge of treatment for headache, head injury, etc. If so, the chart was scored as "concealment." This information was then compared with that reported by MEPCOM to determine if the numbers were similar.

BMI was calculated for each basic trainee and classified using the National Institutes of Health 1998 clinical BMI guidelines for obesity: underweight, <18.5; normal, 18.5–24.9; overweight, 25.0–29.9; obesity I, 30.0–34.9; obesity II, 35.9–39.9; and obesity III, 40.0+ [12].

Blood pressure was grouped into four categories using the 2003 JNC 7 clinical guidelines: optimal, <120/<80 mmHg; prehypertensive, 120–139/80–89 mmHg; hypertension I, 140–159/90–99 mmHg; hypertension II, 160+/100+ mmHg [13].

Results

The breakdown, by service, follows: 54 (46.1%) Army, 27 (23.1%) Navy, 27 (23.1%) Marine, 7 (6.0%) Air Force, and 2 (1.7%) Coast Guard. Mean and median ages were similar between the study and general recruit populations and across all five service branches. Males were a greater proportion of those discharged in all branches except the Air Force. However, when compared with general accession data, females were relatively overrepresented in EPTS headache cases. Among EPTS discharges for headache, 30.8% were female, compared with 18.0% of all female recruits. This difference was statistically significant ($p = 0.0003$).

When analyzed by age category, nearly 95% of recruits were younger than age 26 years. Age differences between headache sufferers and the general recruit population were not significant.

Regarding race, the population of EPTS headache cases follows: 95 (81.2%) white, 17 (14.5%) black, and 3 (2.6%) "other." Race was unknown in two persons (1.7%). When compared with all accessions, there was statistical significance for whites ($p = 0.0142$). In all accessions, whites accounted for 70.9% of the population. In the EPTS headache population, however, whites comprised 81.2% of the population.

The other 2001 data for active duty accessions for Army, Navy, Air Force, and Marines show similar characteristics to the study population, but no further statistically significant differences. See Table 15 for expanded demographics and comparison of the study population to the general active duty accession population.

TABLE 15. DEMOGRAPHICS OF RECRUITS RECEIVING EPTS DISCHARGE FOR HEADACHE DISORDER AND GENERAL RECRUIT ACCESSION POPULATION: 2001*

Characteristic	% EPTS headache (n = 117)	% Recruits accessed (n = 169,795)*	p value (chi-square)
Gender			
Male	69.2	82.0	0.0003
Female	30.8	18.0	0.0003
Age			
17–20 yr	70.9	73.5	0.522
21–25 yr	22.2	21.2	0.787
26–30 yr	3.4	4.2	0.674
>30 yr	2.6	1.1	0.129
Race			
White	81.2	70.9	0.0142
Black	14.5	18.6	0.258
Other	2.6	6.6	0.0787

*Data for Coast Guard unavailable.

Most recruits ($n = 102$, 87.2%) were found to have concealed a prior history of severe headaches. Eleven (9.4%) either reported a history of headache/neurological problem on the MEPS questionnaire or had such a history discovered by MEPS physicians. Of these 11, seven reported prior treatment for, or symptoms of, headaches. One recruit reported dizziness/fainting episodes; one recruit reported having been hospitalized in the past for headaches; and two reported history of headache ensuing from head injury. Of the two with head injury, one also reported periods of unconsciousness, and the other reported receiving treatment for a neoplastic process, depression/anxiety, and hospitalization for the head injury. Of the 11 recruits disclosing their headache conditions, only three (2.6%) were disqualified (of which one was disqualified for reasons other than headache). MEPCOM review reported that 89 EPTS records (76.1%) demonstrated evidence of concealment, and another three records (2.6%) had insufficient evidence to determine. See Figure 10 for MEPCOM EPTS categorization.

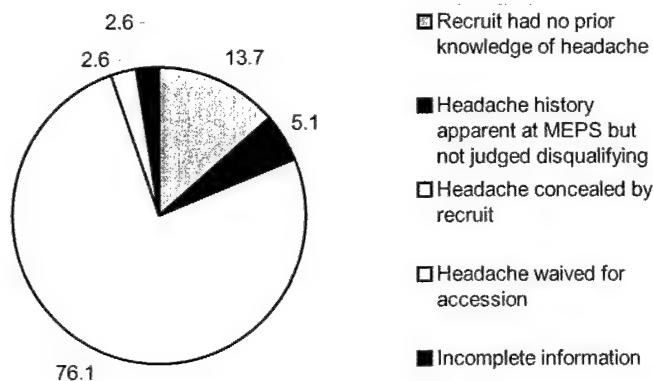


FIGURE 10. PERCENT OF OVERALL RECRUITS BY MEPCOM DISCHARGE TYPE (N = 117).

Regarding lifestyle attributes of recruits, six were nonsmokers, and 10 reported positive smoking histories. Information on smoking status was unavailable for 101 (86.3%). Only seven recruits (6.0%) reported a

history of alcohol abuse, with 109 (93.2%) denying this condition and only one unknown (0.9%). Thirty-six recruits (30.8%) recorded using an illegal drug or abusing prescription drugs, and 80 (68.4%) denied such use. Reported illegal drug use was almost exclusively that of marijuana.

From the MEPS history and physical, only a few headaches were discovered. The MEPS physical profile (PULHES classification), which is supposed to be an overall snapshot of the recruit's physical fitness, recorded a headache in just two recruits (1.7%). Only 10 recruits (8.5%) were disqualified at the MEPS. Of these 10 disqualified recruits, six requested and received a waiver, whereas three did not request a waiver but still managed to access. Data were unclear regarding whether a waiver was requested for one of the 10. Of the six waivers, only two were for headache. As mentioned under "Methods," the MEPCOM database included the "EPTS type" category, in which one possible category was "(E), condition discovered and waived." MEPCOM reported three waivers (2.6%) and three unknown (2.6%). This number is fairly close to the six waivers (5.1%) and one unknown (0.9%) detected through record review.

Most trainees ($n = 103$, 88.0%) presented with a chief complaint of headache, and a similar number of trainees ($n = 101$, 86.3%) carried a primary diagnosis of headache. However, two trainees received headache only as a tertiary diagnosis on the evaluating physicians' forms. One was diagnosed with obsessive-compulsive disorder, followed by depression, followed by headache. The second was diagnosed with suicidal ideation, followed by polysubstance abuse, followed by headache. An additional 10 basic trainees received secondary diagnoses of headache, with the following primary diagnoses (one each, except as noted): depression, adjustment disorder with depressed mood, hypertension ($n = 2$), drug use, pituitary adenoma, bilateral optic disc swelling with hyperemia, asthma, and arthroscopic knee repair.

Although all basic trainees were discharged under general code 784, record review allowed for sub classification of headache type by ICD9 code. See Figure 1 for discharge headache type as determined during this analysis. Of note, 17 (14.5%) persons carried a diagnosis of two or more headache types. Within this subset of multiple-headache patients, 10 (8.5%) were diagnosed with tension headache plus migraine headache without aura.

Nineteen persons (16.2%) were tested during their headache evaluation, with the most frequent tests being CT scan ($n = 9$) and MRI ($n = 7$). Other documented tests included lumbar puncture ($n = 3$), complete blood count ($n = 3$), erythrocyte sedimentation rate ($n = 3$), chemistry ($n = 3$), thyroid function ($n = 3$), electrocardiogram ($n = 2$), and one each of all of the following: chest x-ray, urinalysis, pregnancy test, prolactin concentration, exercise stress test, echocardiogram, barium swallow study, and *Helicobacter pylori* serology. Nine patients (7.7%) received multiple studies.

Despite the fact that three trainees were ill enough to warrant a lumbar puncture, only two (1.7%) were hospitalized. Of these two, only one received the lumbar puncture.

Treatment was offered to 58 trainees (49.6%), and 21 (17.9%) appear to have not been offered treatment. The remaining 38 (32.5%) did not have evidence in the record supporting either treatment or no treatment. Thirty-six persons (30.8%) received multiple treatments. When offered, treatment was widely variable (Fig. 11).

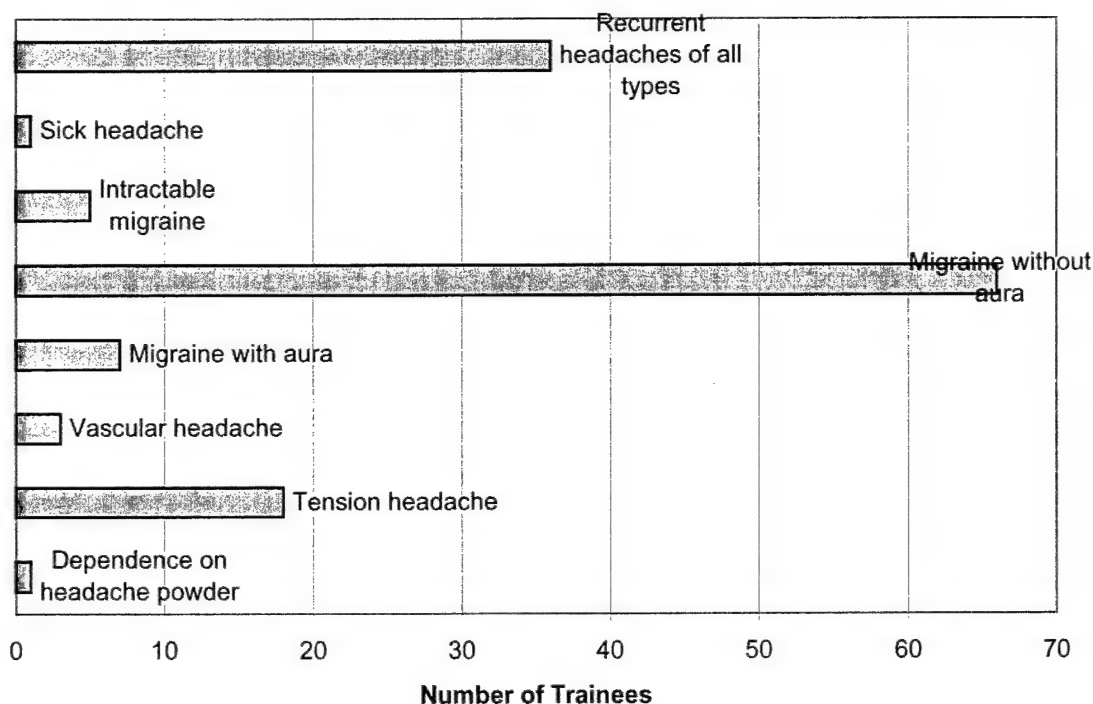


FIGURE 11. NUMBER OF TRAINEES BY TYPE OF HEADACHE AT DISCHARGE (N = 117). No headaches were coded as intractable common migraine (346.11), menstrual migraine (346.2), vasomotor migraine (346.9), post-lumbar puncture headache (349.0), menopausal headache (627.2), or post-lumbar puncture chronic headache (E879.4).

Discussion

The most important information to emerge from this analysis is the fact that among recruits discharged for EPTS headache, over 75% knew of an existing headache condition and seemingly had actively tried to conceal it from MEPS examiners. This presents a challenging situation, because the MEPS process is essentially based on a voluntary doctor/patient relationship. When the recruit is not forthcoming about his or her medical history, MEPS examiners cannot accurately assess past medical history.

Interventions at the MEPS to enhance sensitivity without adding a significant time or cost burden are possible. First, many MEPS questionnaires, when viewed retrospectively, contain information suggestive of headache conditions. These include stated allergies to "migraine" medicines (e.g., ergot alkaloids and triptans) and narcotics, as well as mention of over-the-counter analgesics for headaches. Without clear documentation, it is difficult to determine what dialogue occurred when this information was reported to the examiner. To facilitate accession, however, the headache may have been downplayed by the physician or the recruit (or both). To utilize historical information more fully, MEPS examiners could be educated about the implications of this type of response and dedicate perhaps 30 seconds to exploring a history of headache during the final interview. Future direction should include contacting practicing MEPS examiners to determine the best execution of such an exploration.

Because recruits seem to be concealing information about headaches, additional items on the MEPS questionnaire would probably not be beneficial. It will remain the job of the astute clinician to ferret out headache disorders. A leading statement such as, "You will have headaches in IET if you have been treated for severe headaches in the past," might serve to regroup at least some of the concealing recruits into the population of those disqualified and seeking waiver. In fact, this leading statement need not be limited to headaches. A statement discussing the rigors of IET and noting that any preexisting shortness of breath,

joint pain, etc. might recur during training may likewise work. At this point, the poorly motivated recruits would ostensibly fail without accessing into the armed forces, which would save the cost of testing, specialist consults, etc. Such a tactic would add false-positives to the pool of persons, which would require more time and effort to accurately characterize a medical history. If these false-positives simply translated into greater provision of civilian medical records by the recruits themselves, perhaps the added burden would not fall on the MEPS station, the MEPS examiners, or the government.

This study is limited by the fact that record keeping for EPTS discharges is passive, and the actual percentage of records provided compared with the actual number of EPTS discharges is unknown. Missing records, and missing data within records, can cause misleading conclusions, especially for study conditions such as headache with a small number of cases per year.

Furthermore, there is variability in the quality and completeness of the EPTS records across basic training locations as well as service branches. AMSARA corrected for some of this variability by utilizing a single reviewer who systematically extracted data. However, many records contained no documentation of the treating physicians' assessments and plans, so data had to be extracted only from the paperwork detailing the separation proceedings.

The following conclusions can be drawn from this study. First, EPTS headache recruits appear to be concealing their condition, and current strategies at the MEPS are not effective in elucidating headache history. The problem is admittedly difficult and has no simple solution. Second, the EPTS headache recruits are not readily identifiable by demographic information alone; in essence, they are an invisible subset of the general recruit accession pool. Third, EPTS information reported to MEPCOM and AMSARA is passively provided, and the extent to which the received data represent the actual number of EPTS cases is unknown. The variability within records that are received is also a source of concern. Fourth, even though headache is not a major disqualifying condition, simple screening tests should be considered if they can be shown to be effective and if they do not add significantly to the time and cost of the MEPS evaluation.

Acknowledgement

AMSARA thanks 2LT Patrick Haynes, MS IV, University of Texas Health Sciences Center at San Antonio

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EPTS DISCHARGES FOR DEPRESSION IN 2001: CASE SERIES REVIEW

Introduction

Depression is a prevalent, recurrent condition with frequent comorbidity. Clinical depression is defined as persistent sadness, profound discouragement, or despair that persists ≥ 2 weeks and is associated with a change from previous functioning.

Symptoms of depression include depressed mood, anhedonia, insomnia or hypersomnia, unintentional weight loss or gain, psychomotor agitation or retardation, fatigue, feelings of worthlessness or excessive guilt, difficulty concentrating, and recurrent thoughts of death.

In the general population, the lifetime risk of major depressive disorder is 10–25% for females and 5–12% for males. Depression is likewise common among military personnel, with approximately 20% of females and 17% of males experiencing symptoms. It is one of the most common preexisting conditions leading to discharge within the first 6 months of enlistment. EPTS discharges for depression cost the DoD more than \$2.5 million per year in recruitment, accession, and IET expenses.

Some pertinent risk factors for depression are a prior history of depression, family history of depression, female gender, low socioeconomic status, childhood abuse, adverse childhood events, active alcohol or substance abuse, negative, stressful life circumstances, and relationship problems.

DoD Directive 6130.3 code 300, which applies to neurotic, anxiety, mood, somatoform, dissociative, or factitious disorders, states that a history of depression is disqualifying for military service if any of the following conditions have been met:

- Admission to a hospital or residential facility
- Care by a physician or mental health professional for >6 months
- Symptoms or behavior of a repeated nature that impair social, school, or work efficiency

Recruits are screened for depression at MEPS by completing a medical history questionnaire (SF93). Identification of depressive symptoms or of treatment for a mental condition depends entirely on self-report.

Methods

A retrospective analysis was conducted of all EPTS discharges in 2001 with a primary diagnosis of depression reported to MEPCOM. Records from the Army, Navy, Marines, and Coast Guard were examined; 210 of 214 records matching criteria were available for review. No Air Force records were reviewed because of a policy of administratively discharging recruits with mental illness.

Demographic data, including service, gender, age, and race, were compared with the total accession population. MEPS records, including physical exam (SF88) and medical questionnaire (SF93), were reviewed for indications of a history of depressive symptoms or treatment for depression. Past psychiatric medical history was also obtained from EPTS separation proceedings (DA4707 and DA3897) and clinic notes (SF600) when available.

Results

Most cases were from the Army, but per accession the higher proportion of EPTS discharges for depression was in the Marines. Total accessions data were unavailable for the Coast Guard. Table 16 compares EPTS depression rates in each service.

TABLE 16. EPTS DEPRESSION DISTRIBUTION ACROSS SERVICES*

Service	EPTS discharge		Total accessions	% EPTS discharge/ accessions
	No.	%		
Marines	70	33.8	31,086	0.22
Army	99	47.8	60,554	0.16
Navy	38	18.4	49,332	0.08
Total	207		140,872	0.15

* Air Force and Coast Guard data unavailable.

Analysis of demographic data showed a marked overrepresentation of females and whites. No significant differences in age were noted. Demographic data are reported in Table 17.

TABLE 17. DEMOGRAPHIC DISTRIBUTION OF EPTS DEPRESSION DISCHARGES VS GENERAL ACCESSION POPULATION*

Demographic	All accessions	%	EPTS for depression	%	p value (Z test)
Gender					
Male	139,165	82.0	138	66.7	<0.001
Female	30,628	18.0	69	33.3	<0.001
Age					
17-20 yr	14,839	73.5	148	71.5	0.517
21-25 yr	35,966	21.2	42	20.3	0.749
26-30 yr	7,110	4.2	13	6.3	0.131
>30 yr	1,863	1.1	4	1.9	0.271
Race†					
White	120,286	70.8	176	85.0	<0.001
Black	31,557	18.6	14	6.8	<0.001
Other	11,144	6.6	11	5.3	0.529

* Excluding Coast Guard.

† Excluding six cases with unknown race.

Few recruits reported a history of depressive symptoms (2.9%) or of treatment for depression (5.2%) during applicant screening at MEPS. Those that indicated any past psychiatric history tended to underreport symptoms and treatment. Six psychiatric consults were obtained, and six waivers for a history of depression were granted.

During IET, most recruits (71%) initially presented with complaints of depressive symptoms. Recruits were also referred for mental health evaluation because of suicide gestures ($n = 28$), unauthorized absence ($n = 3$), admitted history of depression ($n = 24$), or physical complaints ($n = 17$). Most physical complaints were of orthopedic pain, e.g., back pain ($n = 6$), tibial stress fractures ($n = 3$), hip pain ($n = 1$), knee contusion and foot pain ($n = 1$), and retropatellar pain. Other complaints included headache ($n = 2$), dizziness ($n = 1$), dissociation ($n = 1$), and renal failure ($n = 1$).

During the mental health evaluation in IET, recruits tended to disclose previously concealed elements of psychiatric history. Most of these recruits related significant past psychiatric histories including counseling

(81.9%), antidepressant medication (66.7%), psychiatric hospitalization (19.5%), childhood physical or sexual abuse (19.0%), self-mutilation (15.2%), violent behavior (3.8%), alcohol dependence (13.3%), illicit drug use (24.8 %), and prior suicide gestures (38.1%).

During IET, 49 recruits also reported having been diagnosed with mental conditions other than depression. Past diagnoses were substance abuse/dependence (8.1%), posttraumatic stress disorder (1.4%), panic disorder (1.4%), obsessive-compulsive disorder (1.0%), postpartum depression (0.5%), and pedophilia (0.5%).

Comparison of MEPS record with past psychiatric history that was reported later demonstrated that 95.7% of recruits had concealed either a history of depression, treatment for depression, or previous diagnosis with another mental disorder.

Discussion

Statistical analysis of demographic characteristics showed an overrepresentation of females, which is expected because of the higher prevalence of depression among females in the general population. Whites were also overrepresented, which is consistent with previous AMSARA studies indicating a higher rate among whites for all causes of EPTS discharge. No significant differences in age among EPTS depression and total accessions were noted.

EPTS rates among the services are difficult to compare. Differences may be caused by reporting bias or by variations in the recruit population and in training practices.

Because depression is subjective and symptoms are easily hidden, identifying recruits with a history of depression is difficult. However, a history of treatment for depression is not subjective and is more reliably identified during selection than symptoms. The direct question screening that is used depends on self-reporting, and most EPTS depression discharges intentionally conceal histories of depression and treatment for depression. Self-reporting in MEPS may be related to motivation level to join the military.

Current questionnaire screening is inadequate. The answers fail to identify recruits with significant psychiatric histories; this leads to a high rate of EPTS discharges for depression and potentially compromises military readiness. Three solutions follow. First, more elaborate screening questionnaires with tests of internal consistency that would be difficult to falsify. Second, developing tests that detect psychoactive medications, especially antidepressants, would help identify some recruits currently receiving treatment and should be considered. Third, requiring recruits to present all civilian medical records might help positively identify those with a history of psychiatric treatment.

DoD Instruction code 300 covers multiple mental illnesses, one of which is depression. This lack of specificity makes tracking EPTS discharges for depression difficult. AMSARA recommends that DoD Instruction code 300 be rewritten to be consistent with the *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition.

Acknowledgement AMSARA thanks 2LT Matthew Campbell, Eastern Virginia Medical School

2. DESCRIPTIVE STATISTICS FOR APPLICANTS AND ACCESSIONS FOR ENLISTED SERVICE

The populations of applicants are described for enlisted service in the active duty, reserve, and National Guard components of the U.S. military during 1997–2002. For the active duty applicants, subsequent accessions are also shown.

Except where otherwise noted, the following conventions apply:

- All references to year refer to calendar year.
- All merging of data sets to derive percentages and rates was performed at an individual level by SSN. For example, in determining the percentage of individuals gained in 2001 who received a discharge, only discharges with SSN matching a 2001 accession record SSN were included.
- Reference to “all applicants” refers to those who had a physical examination at MEPS. Applicants who were dropped from consideration before the medical exam (e.g., those who failed the AFQT) are not included.
- Totals may vary slightly among tables depending on the variable by which percentages or rates are presented. Records with a missing variable relevant to a given table are not included in that table.
- Education level and age at the time of MEPS application are used under “Active Duty Applicants at MEPS with Accession Records” and “Waivers” because MEPS data are the only source of this information for activities before accessions. For “Army Hospitalizations,” “EPTS Discharges of Enlistees,” and “Disability Discharges among Active Duty Army Enlistees,” education level and age at time of accession are used.
- Temporary medical disqualifications are for conditions that can be remedied, such as being overweight or recently using marijuana. Permanent medical disqualifications are for all other disqualifying conditions described in DoD Instruction 6130.4.

Active Duty Applicants at MEPS With Accession Records

Tables 2.1–2.8 describe the population of applicants and subsequent accessions for active duty, enlisted service in the Army, Navy, Marines, and Air Force.

Table 2.1 shows the numbers of applicants and subsequent accession percentages for the aggregate 1997–2001 period and separately for 2002. Accession percentages for the 1997–2001 applicants are shown in two ways: 1) total accession and 2) accession within calendar year of application. For example, the first row shows that 63.9% of Army applicants during 1997–2001 had a subsequent accession record, whereas only 39.4% of the applicants were accessed within the same calendar year in which they applied for service. The second percentage is presented to make a fair basis of comparison for the 2002 accessions; at the time this report was prepared, accession data were unavailable beyond the end of 2002.

The numbers of applications to the Navy and Marines in 2002 are fairly consistent with those of the previous 5 years, because the 2002 applications are roughly one-fifth the number shown over the previous 5 years combined. The applications to the Army and Air Force in 2002 are somewhat higher than expected based on the 1997–2001 applications.

Within-year accession rates within 2002 are slightly lower than the rates seen over 1997–2001 for each service. It is unclear whether this represents an actual change in accession rates, but it is noted for future examination when follow-up data are available.

TABLE 2.1. ACCESSIONS FOR ACTIVE DUTY ENLISTED APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION BY IN 1997–2001 VS 2002: SERVICE

Service	1997–2001			2002	
	Count	Accession rate	Accession rate within the same year	Count	Accession rate within the same year
Army	440,408	63.9	39.4	103,661	33.8
Navy	303,935	70.3	44.4	62,411	35.1
Air Force	193,462	77.4	47.0	48,427	43.1
Marines	213,867	69.6	36.5	45,233	32.8
Total	1,151,672			259,732	

Table 2.2 shows the numbers of applicants for enlisted service by year for 1997–2002 and the numbers of these applicants who subsequently began active duty enlisted service within 1 and 2 years of application. Regulations state that accessions are to occur within 2 years of application.

Calculated accession rates are noticeably lower in 1997 than in other years because Army data are lacking for the second half of 1997. Accession percentages are low for applicants in 2002 owing to the lack of full follow-up data; accession data were only available through 2002. These caveats aside, it appears that approximately two-thirds of applicants are gained onto active duty within 1 year of applying, with only a small percentage being gained more than 1 year after application.

TABLE 2.2. ACCESSIONS WITHIN 1 AND 2 YEARS OF APPLICATION FOR ACTIVE DUTY ENLISTED APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION IN 1997–2002

Year of exam	Applicants	Within 1 yr of application		Within 2 yr of application	
		Count	Accession rate	Count	Accession rate
1997	225,935	126,400	56.0	136,462	60.4
1998	205,959	131,627	63.9	141,858	68.9
1999	229,918	154,151	67.1	163,547	71.1
2000	240,268	162,450	67.6	170,032	70.8
2001	249,592	166,358	66.7	171,528	68.7
2002	259,732	92,720	35.7*	N/A	N/A

* Incomplete follow-up time.

Tables 2.3–2.6 show demographic characteristics (at the time of application) for the applicant pools of 1997–2001 and separately for 2002. Accession percentages are also shown.

Most applicants in 2002 were male (about 80%), aged 17–20 years (about 75%), and white (about 74%). The demographic profiles were roughly the same for applicants in 1996–2000. Roughly 38% of applicants in 2002 had not completed high school at the time of application.

Demographic distributions of accessions reflect the applicant population with regard to gender, age, race, and AFQT score. Slight differences may be seen between applicants and accessions in

2002, although these differences are likely attributable to lack of follow-up data and to random fluctuations that occur within any given year.

The percentage of accessions that had at least a high school education at the time of application was higher than that among applicants. This difference likely reflects the fact that many applicants with less than a high school education at the time of application were still in school by the end of the year and thus had not begun service.

TABLE 2.3. ACCESSIONS FOR ACTIVE DUTY ENLISTED APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION BY IN 1997–2001 VS 2002: GENDER

Gender	1997–2001				2002			
	Applicants		Accessions		Applicants		Accessions	
	Count	%	Count	%	Count	%	Count	%
Male	920,713	79.9	649,958	81.9	207,573	79.9	76,817	82.9
Female	230,940	20.1	143,663	18.1	52,158	20.1	15,903	17.2

TABLE 2.4. ACCESSIONS FOR ACTIVE DUTY ENLISTED APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION BY IN 1997–2001 VS 2002: AGE

Age	1997–2001				2002			
	Applicants		Accessions		Applicants		Accessions	
	Count	%	Count	%	Count	%	Count	%
17–20 yr	884,661	76.8	617,531	77.8	194,431	74.9	67,636	73.0
21–25 yr	208,090	18.1	140,934	17.8	50,627	19.5	20,099	21.7
26–30 yr	45,758	4.0	27,715	3.5	11,117	4.3	3,926	4.2
>30 yr	12,282	1.1	6,768	0.9	3,475	1.3	1,051	1.1

TABLE 2.5. ACCESSIONS FOR ACTIVE DUTY ENLISTED APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION BY IN 1997–2001 VS 2002: RACE

Race	1997–2001				2002			
	Applicants		Accessions		Applicants		Accessions	
	Count	%	Count	%	Count	%	Count	%
White	808,289	70.2	557,621	70.3	192,380	74.1	68,000	73.3
Black	223,754	19.4	151,430	19.1	42,465	16.4	15,657	16.9
Other	119,615	10.4	84,570	10.7	24,887	9.6	9,063	9.8

TABLE 2.6. ACCESSIONS FOR ACTIVE DUTY ENLISTED APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION BY IN 1997–2001 VS 2002: EDUCATION LEVEL

Education level at MEPS	1997–2001				2002			
	Applicants		Accessions		Applicants		Accessions	
	Count	%	Count	%	Count	%	Count	%
Below HS senior*	36,179	3.1	21,940	2.8	8,164	3.1	2,090	2.3
HS senior	342,687	29.8	211,908	26.7	90,583	34.9	25,306	27.3
HS diploma	736,576	64.0	536,284	67.6	150,815	58.1	61,941	66.8
Some college	9,840	0.9	7,096	0.9	2,448	0.9	966	1.0
Bachelor's and above	24,190	2.1	14,626	1.8	6,899	2.7	2,084	2.3

*Encompasses the following: 1) those pursuing completion of the GED or other test-based high school equivalency diploma, vocational school, or secondary school, etc.; 2) those not attending high school and who are neither a high school graduate nor an alternative high school credential holder; and 3) those who are attending high school and are not yet seniors.

The distribution of AFQT scores was similar between applicants and accessions in both 1997–2001 and 2002 (Table 2.7). This similarity likely reflects the fact that individuals achieving a low score on the AFQT are often eliminated from consideration before being given a medical exam. Accordingly, such individuals do not appear among the applicant data. In addition, note that the AFQT is a nationally normed test, so the score distribution among all applicants would not necessarily mirror the percentile ranges.

TABLE 2.7. ACCESSIONS FOR ACTIVE DUTY ENLISTED APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION BY IN 1997–2001 VS 2002: AFQT SCORES

AFQT score	1997–2001				2002			
	Applicants		Accessions		Applicants		Accessions	
	Count	%	Count	%	Count	%	Count	%
93–99	46,272	4.0	32,972	4.2	12,836	4.9	4,741	5.1
65–92	380,139	33.0	272,128	34.3	88,484	34.1	32,532	35.1
50–64	318,530	27.7	224,269	28.3	67,500	26.0	24,066	26.0
30–49	367,641	31.9	252,189	31.8	74,228	28.6	26,870	29.0
1–29	35,763	3.1	12,066	1.5	15,510	6.0	4,511	4.9

Table 2.8 shows the medical qualification status of applicants during 1997–2001 and 2002. Roughly 82% of applicants in 2002 were deemed to be medically qualified for enlisted service. However, almost 90% of the subsequent accessions come from among those applicants with no detected medically disqualifying condition.

In contrast, 6% of applicants in 2002 had a permanent medical disqualification, whereas only about 3% of subsequent accessions came from this group. A similar observation can be made for 1997–2001. The apparent lower accession rate among those with a permanent medical disqualification in part reflects inability or unwillingness of some medically disqualified applicants to acquire the necessary accession medical waiver. Some applicants do not pursue a medical waiver, and those who do might not be granted a waiver. Accession medical waiver numbers and approval rates and the medical nature of conditions considered for waiver are presented under “Waivers.”

Finally, it is apparent that individuals with a temporary medical disqualification represent a smaller percentage of accessions than of applicants. This may reflect an inability or unwillingness of some applicants to remedy the condition that led to a temporary disqualification.

TABLE 2.8. ACCESSIONS FOR ACTIVE DUTY ENLISTED APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION BY IN 1997–2001 VS 2002: MEDICAL QUALIFICATIONS

Qualification	1997–2001				2002			
	Applicants		Accessions		Applicants		Accessions	
	Count	%	Count	%	Count	%	Count	%
Qualified	905,472	78.6	686,573	86.5	212,419	81.8	83,390	89.9
Permanent DQ	100,807	8.8	35,586	4.5	15,658	6.0	2,685	2.9
Temporary DQ	145,393	12.6	71,465	9.0	31,655	12.2	6,645	7.2

Reserve Applicants at MEPS without Accession Records

Tables 2.9–2.15 show the numbers of applicants for the enlisted reserves of the Army, Navy, Marines, and Air Force by demographic features. In particular, reserve applicants who received a medical examination at any MEPS in 1997–2001 (aggregate) and 2002 are represented. Although these individuals were primarily civilians, many accessions into the reserves are direct accessions from active duty and thus would not be included in the results.

Table 2.9 shows the number of applicants, by year, to the reserves. The numbers of reserve applicant records for the Navy decreased steadily and significantly from 1997 to 2002. Although AMSARA has no access to alternative sources of information on reserve applications in the Navy, this decrease appears to be caused by data difficulties rather than to be an actual trend in applications. The numbers of reserve applicants for the Air Force generally increased over this period, although the change was not so marked as in the Navy numbers.

**TABLE 2.9. RESERVE ENLISTED APPLICANTS AT MEPS
WHO RECEIVED A MEDICAL EXAMINATION IN 1997–2002: SERVICE AND YEAR**

Year	Army	Navy	Marines	Air Force
1997	21,639	6,449	7,859	2,092
1998	19,253	3,534	7,234	1,547
1999	21,665	2,194	7,206	2,032
2000	27,030	2,134	7,857	2,578
2001	23,080	1,845	7,507	3,121
2002	23,778	1,806	6,023	3,642
Total	136,445	17,962	43,686	15,012

From Tables 2.10–2.13 it is seen that most applicants in 2002 were male (72.3%), aged 17–20 years (71.0%), and white (71.7%). Sixty percent had at least a high school diploma at the time of application for service, whereas most of the remaining 40% were seniors in high school. The distributions of applicants during 1997–2001 according to these variables were similar to those among 2002 applicants.

**TABLE 2.10. RESERVE ENLISTED APPLICANTS AT MEPS
WHO RECEIVED A MEDICAL EXAMINATION IN 1997–2001 VS 2002: GENDER**

Gender	1997–2001		2002	
	Count	%	Count	%
Male	130,061	73.1	25,470	72.3
Female	47,790	26.9	9,779	27.7

**TABLE 2.11. RESERVE ENLISTED APPLICANTS AT MEPS
WHO RECEIVED A MEDICAL EXAMINATION IN 1997–2001 VS 2002: AGE**

Age	1997–2001		2002	
	Count	%	Count	%
17–20 yr	128,307	72.1	25,038	71.0
21–25 yr	28,351	15.9	6,118	17.4
26–30 yr	12,388	7.0	2,263	6.4
>30 yr	8,641	4.9	1,791	5.1

**TABLE 2.12. RESERVE ENLISTED APPLICANTS AT MEPS
WHO RECEIVED A MEDICAL EXAMINATION IN 1997–2001 VS 2002: RACE**

Race	1997–2001		2002	
	Count	%	Count	%
White	118,875	66.8	25,270	71.7
Black	39,283	22.1	6,847	19.4
Other	19,694	11.1	3,132	8.9

**TABLE 2.13. RESERVE ENLISTED APPLICANTS AT MEPS
WHO RECEIVED A MEDICAL EXAMINATION IN 1997–2001 VS 2002: EDUCATION LEVEL**

Education level at examination	1997–2001		2002	
	Count	%	Count	%
Below HS senior*	22,396	12.6	4,402	12.5
HS senior	45,770	25.7	9,651	27.4
HS diploma	100,431	56.5	18,845	53.5
>HS diploma	2,028	1.1	578	1.6
Bachelor's and above	7,129	4.0	1,724	4.9

* Encompasses the following: 1) those pursuing completion of the GED or other test-based high school equivalency diploma, vocational school, or secondary school, etc.; 2) those who are not attending high school and who are neither high school graduates nor alternative high school credential holders; and 3) those who are attending high school and are not yet seniors.

Table 2.14 shows the distribution of AFQT scores among applicants for enlisted service in the reserves. It is seen that roughly 88% of the applicants in 2002 scored in the 30–92 percentile range. Note that this is a nationally normed test, and some applicants who performed poorly on the test may have had their applications terminated before receiving a medical exam. Therefore, the percentage distributions do not necessarily match the percentile ranges. For example, only 4.3% of the 2002 applicants scored in the 0–29 percentile range.

**TABLE 2.14. RESERVE ENLISTED APPLICANTS AT MEPS
WHO RECEIVED A MEDICAL EXAMINATION IN 1997–2001 VS 2002: AFQT SCORE**

AFQT score	1997–2001		2002	
	Count	%	Count	%
93–99	11,532	6.6	2,776	8.0
65–92	63,233	36.2	13,362	38.5
50–64	44,103	25.2	8,415	24.2
30–49	50,910	29.1	8,643	24.9
1–29	5,066	2.9	1,514	4.4

Table 2.15 shows the numbers and percentages of reserve applicants by medical qualification status. It is seen that roughly 80% of applicants were deemed to be medically qualified for service. Among those not initially qualified, most disqualifications were temporary, i.e., for conditions that can be remedied, such as being overweight.

Table 2.15. RESERVE ENLISTED APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION IN 1997–2001 VS 2002: MEDICAL DISQUALIFICATIONS

Medical disqualification	1997–2001		2002	
	Count	%	Count	%
Qualified	142,018	79.9	28,930	82.1
Permanent DQ	14,977	8.4	2,283	6.5
Temporary DQ	20,861	11.7	4,036	11.5

Army and Air National Guard Applicants at MEPS Without Accession Records

Tables 2.16–2.22 show the numbers of new applicants for service in the enlisted National Guard of the Army and Air Force by demographic and other factors. The Navy and Marines do not have a guard component. The tables represent National Guard applicants who received a medical examination at a MEPS in 1997–2001 (aggregate) or 2002. Although these individuals were primarily civilians, many accessions into the National Guard are direct accessions from active duty and thus would not be included in the results.

Table 2.16 shows the number of applicants, by year and service, to the National Guard. The numbers of applicants to the Air National Guard were considerably lower during 1997–1999 than during 2000–2002. AMSARA cannot determine whether this increase over time reflects true applicant numbers or shortcomings in the data. The numbers of applicants for the Army National Guard remained relatively stable over this period.

TABLE 2.16. ARMY AND AIR NATIONAL GUARD ENLISTED APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION IN 1997–2002: SERVICE AND YEAR

Year	Army National Guard	Air National Guard
1997	34,334	3,972
1998	29,286	2,832
1999	32,169	3,335
2000	37,393	5,028
2001	38,372	5,865
2002	36,912	5,268
Total	208,466	26,300

From Tables 2.17–2.20 it is seen that most applicants in 2002 were male (76.0%), aged 17–20 years (73.8%), and white (79.9%). Approximately 57% had at least a high school diploma at the time of application, and most of the remaining applicants were in their senior year of high school at the time of application. Distributions during 1997–2001 according to these variables were similar to those among the 2002 applicants.

TABLE 2.17. ARMY AND AIR NATIONAL GUARD ENLISTED APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION IN 1997–2001 VS 2002: GENDER

Gender	1997–2001	%	2002	%
Male	148,891	77.3	32,066	76.0
Female	43,689	22.7	10,114	24.0

TABLE 2.18. ARMY AND AIR NATIONAL GUARD ENLISTED APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION IN 1997–2001 VS 2002: AGE

Age	1997–2001		2002	
	Count	%	Count	%
17–20 yr	138,886	72.1	31,129	73.8
21–25 yr	31,639	16.4	7,104	16.8
26–30 yr	12,899	6.7	2,434	5.8
>30 yr	8,857	4.6	1,482	3.5

TABLE 2.19. ARMY AND AIR NATIONAL GUARD ENLISTED APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION IN 1997–2001 VS 2002: RACE

Race	1997–2001		2002	
	Count	%	Count	%
White	147,742	76.7	33,685	79.9
Black	30,763	16.0	6,101	14.5
Other	14,078	7.3	2,394	5.7

TABLE 2.20. ARMY AND AIR NATIONAL GUARD ENLISTED APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION IN 1997–2001 VS 2002: EDUCATION LEVEL

Education level at examination	1997–2001%		2002	
	Count	%	Count	%
Below HS senior*	30,947	16.1	6,859	16.3
HS senior	47,032	24.4	11,008	26.1
HS diploma	106,332	55.2	22,270	52.8
Some college	2,407	1.3	580	1.4
Bachelor's and above	5,601	2.9	1,238	2.9

* Encompasses the following: 1) those who are pursuing completion of the GED or other test-based high school equivalency diploma, vocational school, or secondary school, etc.; 2) those who are not attending high school and who are neither high school graduates nor alternative high school credential holders; and 3) those who are attending high school and are not yet seniors.

Table 2.21 shows the distribution of AFQT scores among applicants for enlisted service in the Army and Air National Guard. It is seen that 86% of the applicants in 2002 scored in the 31–92 percentile range. Note that this is a nationally normed test, and some applicants who perform poorly may have had their applications terminated before receiving a medical exam. Therefore, the percentage distributions do not necessarily match the percentile ranges. For example, only 7.3% of the 2002 applicants scored in the 0–29 percentile range. This percentage was somewhat higher than the 4.0% seen among applicants during 1997–2001.

TABLE 2.21. ARMY AND AIR NATIONAL GUARD ENLISTED APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION IN 1997–2001 VS 2002: AFQT SCORE

AFQT score	1997–2001		2002	
	Count	%	Count	%
93–99	9,389	4.9	2,661	6.3
65–92	60,352	31.3	13,992	33.2
50–64	41,784	21.7	9,284	22.0
30–49	66,896	34.7	12,983	30.8
1–29	7,742	4.0	3,065	7.3
Missing	6,423	3.3	195	0.5

Table 2.22 shows the numbers and percentages of Army and Air National Guard applicants by medical qualification status. It is seen that just under 80% of 2002 applicants were deemed to be medically qualified for service. Among those not immediately qualified, most disqualifications were temporary, i.e., for conditions that can be remedied, such as being overweight.

TABLE 2.22. ARMY AND AIR NATIONAL GUARD ENLISTED APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION IN 1997–2001 VS 2002: MEDICAL DISQUALIFICATIONS

Disqualification	1997–2001		2002	
	Count	%	Count	%
Qualified	145,773	75.7	33,352	79.1
Permanent DQ	18,042	9.4	2,785	6.6
Temporary DQ	28,771	14.9	6,043	14.3

Medical Disqualifications among Applicants For First-Time Active Duty Enlisted Service

Table 2.23 shows the numbers of medical disqualifications among applicants for all services during 1997–2000 and 2002, separately, categorized by the MEPCOM medical failure codes (see “MEPS” in Section 4). The 2001 data were not included in this analysis because the coding of medical disqualifications was changed during this year, and it was not clear for many of disqualifications which coding was being used. The first set of columns shows the numbers of disqualifications according to the first code listed for each individual. The second set of columns shows all disqualification codes among these applicants, including multiple disqualifications per individual where applicable.

The most common reason for disqualification was failure to meet body weight standards, with 17,269 individuals receiving a disqualification for this reason in 2002. This is generally a temporary disqualification that can be eliminated by either gaining or losing weight, as appropriate. The next most common, which is also generally temporary, was for use of *Cannabis sativa* (marijuana). The third most common overall, and the most common of the permanent disqualifications, was for lungs/chest, a category that includes history of asthma.

TABLE 2.23. DISQUALIFICATIONS OF APPLICANTS BY MEPCOM MEDICAL FAILURE CODES BY MEPS MEDICAL FAILURE CODES: 1997-2000* VS 2002

Category	Primary failure				All failures			
	1997-2000		2002		1997-2000		2002	
	Count	%	Count	%	Count	%	Count	%
Weight	61,508	22.4	16,386	24.5	67,246	21.3	17,269	23.9
<i>Cannabis sativa</i>	41,533	15.1	8,696	13.0	43,416	13.7	9,028	12.5
Lungs/chest	18,172	6.6	4,131	6.2	20,611	6.5	4,783	6.6
Audiometer	17,033	6.2	4,111	6.2	19,863	6.3	4,269	5.9
Lower extremities	16,004	5.8	3,460	5.2	19,417	6.1	3,737	5.2
Skin/lymphatics	11,368	4.1	2,263	3.4	13,277	4.2	2,525	3.5
Feet	9,912	3.6	1,652	2.5	11,800	3.7	1,796	2.5
Other psychiatric	8,919	3.2	3,895	5.8	11,350	3.6	4,052	5.6
Upper extremities	8,153	3.0	2,161	3.2	9,663	3.1	2,384	3.3
Refraction	7,552	2.8	2,500	3.7	9,058	2.9	2,592	3.6
Blood pressure	7,425	2.7	1,887	2.8	8,543	2.7	2,139	3.0
Genitourinary system	6,549	2.4	1,328	2.0	7,764	2.5	1,465	2.0
Other tests	5,760	2.1	283	0.4	7,086	2.2	309	0.4
Abdomen/viscera	5,701	2.1	1,424	2.1	6,563	2.1	1,587	2.2
Spine/other musculature	4,867	1.8	963	1.4	6,011	1.9	1,102	1.5
All other	44,625	16.2	11,687	17.5	54,635	17.3	13,370	18.5
Total	275,081	100.0	66,827	100.0	316,303	100.0	72,407	100.0

* THE MEPCOM MEDICAL DISQUALIFICATION CODES WERE CHANGED IN 2001, AND BOTH OLD AND NEW CODES WERE USED WITHOUT DISTINCTION IN THE 2001 DATA. HENCE, THE 2001 DATA WERE EXCLUDED.

Within the past few years, MEPCOM has begun to assign ICD9 diagnostic codes to more accurately indicate the reasons for medical disqualifications among applicants. This initiative is in its early stages, because the process of standardizing usage of these complex codes by officials at 65 geographically separated sites presents a considerable logistical challenge. Accordingly, AMSARA simply presents the codes that were used for applicants during 2002, without comparisons to the traditional medical failure codes summarized above. Note that although some categories are similar to those in the table above, they are generally not identical and can only be compared in terms of rough numbers.

Table 2.24 shows the numbers of medical disqualifications among applicants for all services in 2002, categorized by groupings of ICD9 codes. It is seen that being overweight is the leading cause of medical disqualification, with 15,746 individuals being disqualified for this. Drug abuse is second with 10,886 disqualifications. Hearing deficiency and asthma, both permanent disqualifications, were the third- and fourth-leading causes, respectively.

TABLE 2.24. MEDICAL DISQUALIFICATIONS OF APPLICANTS BY ICD9 CODES: 2002**

ICD9 code	DQ by persons		DQ by codes*	
	Count	%	Count	%
Overweight†	14,943	22.4	15,746	21.95
Drug abuse§	10,378	15.6	10,886	15.2
Hearing deficiency	3,918	5.9	4,068	5.7
Asthma	3,398	5.1	3,978	5.6
Visual‡	3,156	4.7	3,309	4.6
Hypertension	1,808	2.7	2,061	2.9
Underweight	1,725	2.6	1,823	2.5
Other disorder bone cartilage	1,116	1.7	1,178	1.6
Neurotic	918	1.4	1,043	1.5
Hyperkinetic syndrome	948	1.4	1,019	1.4
Cardiovascular	682	1.0	812	1.1
Pregnant	677	1.0	703	1.0
Inguinal hernia	568	0.9	616	0.9
Depressive disorders	271	0.4	319	0.4
Others	22,257	33.3	24,153	33.7
Total	66,763	100.0	71,714	100.0

** Year 2002 was the first for which ICD codes were provided.

* Multiple disqualifications per applicants are included.

† Includes MEPCOM code OVR, ICD-9 278 (obesity), and 783 (abnormal weight gain).

§ Includes 305.2 (cannabis abuse), 305.6 (cocaine abuse), and 305 and 306 (all other drug abuse).

‡ Includes refractive disorders (367), refractive surgery (P11.6, 11.7), visual disturbances (368), and low vision (369).

Waivers

Applicants who receive a permanent medical disqualification at the MEPS may be granted an accession medical waiver for the disqualifying condition(s) from a service-specific waiver authority. This section summarizes the numbers of waiver considerations during 1997–2001 and 2002 separately. Part I examines all waiver consideration records, regardless of whether a corresponding MEPS record was available. Part II examines only those waiver records for which there is a matching applicant record in the MEPS data. The counts of waiver records in part I will therefore differ from those in part II.

Individuals frequently have multiple records of waiver consideration by the same waiver authority, which likely reflects resubmissions, perhaps with additional information. Only the most current record on each individual was considered. Therefore the numbers of considerations do not reflect overall workload of the waiver authorities.

Note that a waiver application that is denied by one waiver authority might be submitted to another. In such a case, the individual would be counted twice in the tables. Finally, note that only waiver applications are summarized in this section, so these individuals may eventually gain or have been gained into duty.

Part I: Waivers Without Accession

Tables 2.25–2.29 summarize the accession medical waiver considerations for active duty enlisted applicants in 1997–2002 for the Army, Navy, Marines, and Air Force. All waiver considerations are included, regardless of whether AMSARA has a corresponding MEPS record or whether the individual was subsequently gained onto active duty.

Table 2.25 shows raw counts (i.e., no matching of records to applicant or accession data) of waiver considerations and approval percentages in each year from 1997 to 2002 by service and year of waiver decision. The approval percentages are derived by dividing number of approvals by total number of considerations for a particular waiver authority in a calendar year. Note that a waiver can be denied by one service authority and granted by another, so an individual could be counted more than once in this table.

Over this period the number of Army waiver consideration records has generally increased to a peak of 15,434 in 2002, which is far more than in any other year. The numbers of considerations for the Navy and Marines have fluctuated less, and there has been no clear upward or downward trend. The numbers of considerations for the Air Force was relatively constant at about 2,000 per year over 1997–2001 but increased to 2,986 in 2002.

Approval rates for the Army increased to a peak of 66.8% in 2000 and have been at about 60% in 2001 and 2002. Waiver approval rates have generally decreased over time for the Navy and Marines, with respective approval rates of 61.8% and 66.5% in 1997 that dropped to 44.2% and 42.8% in 2001. For the Air Force, approval rates increased dramatically to >50% in 2001 and 2002; Air Force rates were <40% before 2000.

Note that the numbers of considerations and approvals shown in Table 2.25 will be higher than in Tables 2.26–2.29, because those tables show only those waiver considerations with an associated medical diagnosis code. Some waiver records fail to indicate the medical condition for which the waiver is being considered and are therefore excluded from Tables 2.26–2.29.

TABLE 2.25. WAIVER CONSIDERATIONS FOR ACTIVE DUTY ENLISTED APPLICANTS BY SERVICE AND YEAR*

Year	Army		Navy		Marines		Air Force	
	Count	% Approved	Count	% Approved	Count	% Approved	Count	% Approved
1997	9,488	53.0	3,957	61.8	2,095	66.5	2,120	38.2
1998	8,535	57.6	5,229	65.5	3,171	65.3	1,733	38.3
1999	9,909	58.2	6,574	52.8	3,826	63.4	1,887	33.9
2000	11,772	66.8	6,242	50.6	3,442	55.7	2,124	41.0
2001	11,504	60.3	5,330	44.2	3,223	42.8	2,199	57.4
2002	15,434	60.1	5,455	45.2	3,207	42.5	2,923	53.0
Total	66,642	59.7	32,787	52.8	18,964	55.6	12,986	44.6

*The rate for 2002 is underestimated due to incomplete follow up time.

Tables 2.26–2.29 show the conditions for which the most accession medical waivers were considered by the Army waiver authority during 1997–2001 and the numbers of approvals for these conditions over this period. Also shown are the corresponding numbers of waiver considerations and approvals for those conditions in 2002. As expected, approval percentages vary according to the medical condition involved.

It can also be seen that the numbers of waiver approvals for several conditions in 2002 are dramatically different from what was expected based on the numbers over the 5 years from 1997 to 2001. For example, 918 Army waiver approvals for disorders of refraction were granted during 2002, but only 3,004 (an average of about 600 per year) were granted during 1997–2001.

Some of these differences result from varying numbers of considerations, which in turn can result from changes in medical standards over time, or several other factors. Some of these differences may represent random fluctuations or may be related to changes in personnel or philosophy within a waiver authority. It is also possible, however, that such differences are the result of data shortcomings.

Table 2.26 shows the top medical conditions for waiver consideration by the Army. The medical condition categories were created according to the first three digits of the ICD9 code(s) assigned to each waiver consideration.

Hearing deficiency is the condition for which waivers were most often considered in 1997–2001, accounting for 5,623 (14.8% of all considerations) in this period. Hearing deficiency is also the most common condition for waiver considerations and approvals in 2002, although not by such wide margins as in 1997–2001. Disorders of refraction is the second leading condition for waiver approvals in 1997–2001 and asthma is the third most common, with each accounting for roughly 10% of considerations and approvals during 1997–2001 and 2002. All other conditions had considerably fewer waiver approvals than these top three conditions.

TABLE 2.26. TOP 10 ICD9 DIAGNOSES OF WAIVERS CONSIDERED AND GRANTED FOR ACTIVE DUTY ENLISTED APPLICANTS IN 1997–2001 VS 2002: ARMY

ICD9 code	Definition	1997–2001				2002			
		Applied		Granted		Applied		Granted	
		Count	%	Count	%	Count	%	Count	%
389	Hearing deficiency	5,623	14.8	4,432	15.3	1,827	12.6	1,060	12.0
367	Disorders of refraction and accommodation	3,785	10.0	3,004	10.4	1,360	9.4	918	10.4
493	Asthma	3,751	9.9	2,796	9.7	1,355	9.4	881	10.0
754	Certain congenital musculoskeletal deformities	1,901	5.0	1,628	5.6	274	1.9	171	1.9
717	Internal derangement of knee	1,729	4.6	1,428	4.9	392	2.7	246	2.8
401	Hypertension	1,346	3.5	1,052	3.6	302	2.1	167	1.9
306	Physiological malfunction arising from mental factors	845	2.2	844	2.9	352	2.4	350	4.0
785	Symptoms involving cardiovascular system	740	2.0	651	2.3	186	1.3	142	1.6
314	ADHD	510	1.3	402	1.4	325	2.3	279	3.2
737	Curvature of spine	470	1.2	289	1.0	186	1.3	67	0.8
	All others	17,300	45.5	12,386	42.8	7,911	54.7	4,549	51.5
	Total*	38,000	100.0	28,913	100.0	14,470	100.0	8,831	100.0

* Numbers of waiver applications/approvals for which a medical diagnosis code was provided, which may be slightly less than the total numbers of considerations (i.e., a small percentage had no medical code included, specially for those denied). Totals are for applicants with DoD code, not the total waiver applicants.

Table 2.27 shows the conditions for which the most accession medical waivers were considered by the Navy waiver authority during 1997–2001 and the corresponding numbers of waiver

considerations and approvals for those conditions in 2002. The medical condition categories are as defined in DoD Instruction 6130.3 (see "Waiver" in Section 4).

Asthma is the condition for which Navy waivers were most often considered in 1997–2001, closely followed by hearing deficiency and then disorders of refraction. These three conditions were involved in 2,808 (10.9%), 2,744 (10.6%), and 2,217 (8.6%) of Navy waiver considerations during that period. These were also the top three conditions in 2002, although asthma dropped to third.

Although asthma was involved in the most considerations, both disorders of refraction and hearing deficiency had larger numbers of waiver approvals in 1997–2001. In 2002, the most approvals were for disorders of refraction and hearing deficiency.

TABLES 2.27. TOP 10 DoD DIAGNOSES OF WAIVERS CONSIDERED AND GRANTED FOR ACTIVE DUTY ENLISTED APPLICANTS IN 1997–2001 VS 2002: NAVY

DoD code	Definition	1997–2001				2002			
		Applied		Granted		Applied		Grant	
		Count	%	Count	%	Count	%	Count	%
493	Asthma	2,808	10.9	1,146	8.1	531	10.6	138	6.1
389	Hearing deficiency	2,744	10.6	1,279	9.1	622	12.4	219	9.6
367	Disorders of refraction and accommodation	2,217	8.6	1,298	9.2	605	12.1	369	16.2
754	Certain congenital musculoskeletal deformities	1,332	5.2	1,017	7.2	157	3.1	103	4.5
401	Hypertension	1,040	4.0	823	5.8	234	4.7	194	8.5
717	Internal derangement of knee	1,040	4.0	690	4.9	80	1.6	28	1.2
796	Miscellaneous conditions	986	3.8	552	3.9	132	2.6	59	2.6
733	Physiological malfunction arising from mental factors	969	3.8	696	4.9	314	6.3	210	9.2
300	Neurotic, mood, somatoform, dissociative or factitious disorders	723	2.8	361	2.6	104	2.1	17	0.8
995	Nonspecific abnormal histological or immunological findings	580	2.2	385	2.7	169	3.4	86	3.8
	All others	11,429	44.2	5,843	41.5	2,070	41.3	853	37.5
Total		25,868	100.0	14,090	100.0	5,018	100.0	2,276	100.0

Table 2.28 shows the conditions for which the most accession medical waivers were considered by the Marine waiver authority during 1997–2001 and the corresponding numbers of waiver considerations and approvals for those conditions in 2002. The medical condition categories are as defined in the DoD Instruction 6130.3 (see "Waiver" in Section 4).

Asthma is the condition for which waivers were most often considered in 1997–2001, with 1,888 considerations. It was also the condition involved in the highest number of waiver approvals during this time, with 1,066. Hearing loss and disorders of refraction had the second and third most considerations, respectively, with slightly more approvals for the disorders of refraction.

The ordering of considerations by condition in 2002 was similar to that in 1997–2001, although the approvals differed. In particular, few waiver approvals (23 out of 340 considered) were considered for hearing loss.

TABLE 2.28. TOP 10 DoD DIAGNOSES OF WAIVERS CONSIDERED AND GRANTED FOR ACTIVE DUTY ENLISTED APPLICANTS IN 1997–2001 VS 2002: MARINES

DoD code	Definition	1997–2001				2002			
		Applied		Granted		Applied		Granted	
		Count	%	Count	%	Count	%	Count	%
493	Asthma	1,888	12.5	1,066	12.1	392	12.9	172	13.4
389	Hearing loss	1,675	11.1	651	7.4	340	11.2	23	1.8
367	Disorders of refraction and accommodation	1,290	8.5	681	7.7	294	9.7	150	11.7
717	Internal derangement of knee	764	5.1	550	6.3	81	2.7	44	3.4
796	Miscellaneous conditions	737	4.9	400	4.6	189	6.2	97	7.6
401	Hypertension	708	4.7	583	6.6	155	5.1	106	8.3
754	Certain congenital musculoskeletal deformities	663	4.4	509	5.8	35	1.2	18	1.4
733	Physiological malfunction arising from mental factors	607	4.0	455	5.2	153	5.0	114	8.9
300	Neurotic, mood, somatoform, dissociative, or fascitious disorders	424	2.8	235	2.7	126	4.2	52	4.1
314	ADHD	373	2.5	263	3.0	158	5.2	100	7.8
	All others	6,006	39.7	3,403	38.7	1,112	36.6	406	31.7
Total		15,135	100.0	8,795	100.0	3,035	100.0	1,282	100.0

Table 2.29 shows the conditions for which the most accession medical waivers were considered by the Air Force waiver authority during 1997–2001 and the corresponding numbers of waiver considerations and approvals for those conditions in 2002. The medical condition categories are as defined in DoD Instruction 6130.3 (see “Waiver” in Section 4).

Disorders of refraction were the condition for which Air Force waivers were most often considered in 1997–2001 ($n = 1,276$). It was also the condition involved in the highest number of waiver approvals during this time ($n = 773$), more than double that of the second most common approval condition. Asthma was the second leading condition considered for waiver, followed by hearing deficiency. These were the same top three conditions for waiver consideration in 2002.

The distribution of waiver approvals looks considerably different, with few (27 of 673 considerations in 1997–2001) waivers being granted for hearing deficiency and high numbers being granted for ADHD, pes planus, and reduction of fracture/dislocation. A similar pattern was seen in waiver approvals for 2002.

TABLE 2.29. TOP 10 DIAGNOSES OF WAIVERS CONSIDERED AND GRANTED FOR ACTIVE DUTY ENLISTED APPLICANTS IN 1997–2001 VS 2002: AIR FORCE

ICD9 code	Definition	1997–2001				2002			
		Applied		Granted		Applied		Granted	
		Count	%	Count	%	Count	%	Count	%
367	Disorders of refraction and accommodation	1,276	13.0	773	18.6	320	11.6	184	12.3
493	Asthma	927	9.4	230	5.5	294	10.6	94	6.3
389	Hearing deficiency	673	6.9	27	0.7	143	5.2	11	0.7
P81	Repair of cruciate ligament	412	4.2	375	9.0	69	2.5	60	4.0
314	ADHD	402	4.1	304	7.3	127	4.6	91	6.1
734	Pes planus(acquired)	389	4.0	277	6.7	59	2.1	41	2.8
P79	Reduction of fracture and dislocation	303	3.1	213	5.1	136	4.9	122	8.2
296	Major depressive disorder	288	2.9	117	2.8	47	1.7	29	2.0
718	Instability of joint	245	2.5	99	2.4	86	3.1	53	3.6
754	Certain congenital musculoskeletal deformities	210	2.1	29	0.7	55	2.0	22	1.5
	All others	4,694	47.8	1,710	41.2	1,431	51.7	784	52.6
	Total	9,819	100.0	4,155	100.0	2,767	100.0	1,491	100.0

Part II: Waivers With Accession

Table 2.30 shows the numbers of individuals granted accession medical waiver approvals during each year from 1997 through 2002. Also shown are the numbers and percentages of these individuals who were subsequently gained onto active duty within 1 and 2 years of application at MEPS.

As seen in “Part I: Without Accession,” the numbers of waiver approvals have generally increased over the period, with 8,779 in 1997 to a peak of more than 13,000 in 2002. This increase can be partly attributed to an increased number of waiver considerations by each waiver authority over time.

Accession percentages of these applicants were generally over 50% within 1 year of initial application. The only exceptions were among those granted a waiver in 1997, when Army accession data were grossly short, and 2002, for which there were incomplete follow-up data. Also, except for 1997 and 2002, the 2-year accession percentages ranged from 64% to 70%.

**TABLE 2.30. ACCESSIONS WITHIN 1 AND 2 YEARS OF PHYSICAL EXAMINATION
FOR ACTIVE DUTY ENLISTED APPLICANTS WHO RECEIVED A WAIVER IN 1997–2002 BY YEAR**

Year of waiver consideration	Applicants with waivers granted	Applicants who accessed within 1 year of application		Applicants who accessed within 2 years of application	
		Count	Accession rate	Count	Accession rate
1997	8,779	4,210	48.0	5,086	57.9
1998	9,102	4,981	54.7	6,046	66.4
1999	10,841	6,487	59.8	7,540	69.6
2000	11,504	6,636	57.7	7,618	66.2
2001	10,323	5,915	57.3	6,672	64.6
2002	13,102	4,638	35.4	*	N/A*
Total	63,651	32,867	*	38,104	*

* Incomplete follow-up time.

Tables 2.31–2.35 summarize waiver considerations during 1997–2001 and 2002, separately, among individuals with a corresponding MEPS application record. Subsequent accession numbers are also shown. These are shown for several demographic factors. Numbers of records in these tables may vary slightly depending on the completeness of data on the demographic factor being considered.

Table 2.31 shows the gender distribution of applicants receiving a waiver and those who subsequently came onto active duty. The distribution was the same in 1997–2001 and 2002. Females accounted for a slightly smaller percentage of subsequent accessions than of waiver approvals.

TABLE 2.31. ACCESSIONS FOR ACTIVE DUTY ENLISTED APPLICANTS WHO RECEIVED A WAIVER IN 1997–2001 vs2002: GENDER

Gender	1997–2001				2002			
	All waivers		Accessed only		All waivers		Accessed only	
	Count	%	Count	%	Count	%	Count	%
Male	40,811	80.7	29,369	82.9	10,569	80.7	4,692	84.2
Female	9,738	19.3	6,069	17.1	2,533	19.3	881	15.8

Table 2.32 shows that the age distribution of applicants with waiver approvals was similar in 1997–2001 and 2002. The age distribution of those who were subsequently accessed closely reflected the applicant distribution.

TABLE 2.32. ACCESSIONS FOR ACTIVE DUTY ENLISTED APPLICANTS WHO RECEIVED A WAIVER IN 1997–2001vs 2002: AGE

Age	1997–2001				2002			
	All waivers		Accessed only		All waivers		Accessed only	
	Count	%	Count	%	Count	%	Count	%
17–20 yr	37,326	73.8	26,614	75.1	9,213	70.3	3,986	71.5
21–25 yr	9,628	19.1	6,710	18.9	2,779	21.2	1,183	21.2
26–30 yr	2,648	5.2	1,620	4.6	810	6.2	305	5.5
>30 yr	903	1.8	457	1.3	291	2.2	95	1.7

Table 2.33 shows that whites made up a slightly greater percentage of waiver approvals among 2002 applicants than among 1997–2001 applicants. This increase may reflect a difference in the applicant pool, differing likelihood of disqualifying conditions by race, or random variation. The distribution of subsequent accessions was similar to the applicant distribution.

TABLE 2.33. ACCESSIONS FOR ACTIVE DUTY ENLISTED APPLICANTS WHO RECEIVED A WAIVER IN 1997–2001 VS 2002: RACE

Race	1997–2001				2002			
	All waivers		Accessed only		All waivers		Accessed only	
	Count	%	Count	%	Count	%	Count	%
White	36,613	72.4	25,632	72.3	10,110	77.2	4,328	77.7
Black	9,207	18.2	6,477	18.3	1,929	14.7	813	14.6
Other	4,728	9.4	3,328	9.4	1,063	8.1	432	7.8

Table 2.34 shows the distribution of education level at the time of application among applicants with a waiver approval and among those subsequently accessed. The distribution among waiver recipients in 2002 was similar to that in 1997–2001. Note that many of these who have less than a high school education at the time of application finish high school before enlistment.

TABLE 2.34. ACCESSIONS FOR ACTIVE DUTY ENLISTED APPLICANTS WHO RECEIVED A WAIVER IN 1997–2001 VS 2002: EDUCATIONAL LEVEL

Education level	1997–2001				2002			
	All waivers		Accessed only		All waivers		Accessed only	
	Count	%	Count	%	Count	%	Count	%
Below HS*	2,225	4.4	1,240	3.5	638	4.9	184	3.3
HS senior	14,226	28.2	9,515	26.9	4,070	31.1	1,642	29.5
HS diploma	31,810	63.0	23,306	65.9	7,622	58.3	3,498	62.9
Some college	530	1.1	342	1.0	158	1.2	57	1.0
Bachelor's and above	1,700	3.4	991	2.8	586	4.5	183	3.3

* Encompasses the following: 1) those who are pursuing completion of the GED or other test-based high school equivalency diploma, vocational school, or secondary school, etc.; 2) those who are not attending high school and who are neither high school graduates nor alternative high school credential holders; and 3) those who are attending high school and are not yet seniors.

Table 2.35 summarizes percentile scores on the AFQT among applicants and subsequent accessions with an accession medical waiver. The score distribution among waiver recipients in 2002 is skewed slightly toward the extremes compared with waiver recipients in 1997–2001, with greater percentages in the highest and lowest percentile ranges. The same is true of the subset of waiver recipients who subsequently accessed.

TABLE 2.35. ACCESSIONS FOR ACTIVE DUTY ENLISTED APPLICANTS WHO RECEIVED A WAIVER IN 1997–2001 VS 2002: AFQT SCORE

AFQT score	1997–2001				2002			
	All waivers		Accessed only		All waivers		Accessed only	
	Count	%	Count	%	Count	%	Count	%
93–99	3,018	6.0	1,964	5.5	950	7.3	354	6.4
65–92	18,108	35.8	12,471	35.2	4,858	37.1	1,985	35.6
50–64	13,789	27.3	9,805	27.7	3,356	25.6	1,446	26.0
30–49	14,901	29.5	10,791	30.5	3,481	26.6	1,597	28.7
1–29	650	1.3	407	1.2	419	3.2	191	3.4

Army Hospitalizations

Uncertainty over the coverage and ramifications of the Health Insurance Portability and Accountability Act resulted in a delay of hospitalization data transmission for services other than the Army during the 2003. Accordingly, only Army hospitalization data will be summarized in this section.

Part I: Without Accession Records

Hospitalization records of servicemembers to any military treatment facility are summarized, regardless of whether AMSARA has an accession record corresponding to the hospitalized individual. Except where indicated, the tables include all hospitalizations, regardless of length of time in service before hospitalization. For those tables that present results according to length of service before hospitalization, the length of service was taken from a field within each hospitalization record.

Table 2.36 shows overall Army hospitalization counts and percentages during the first and second years of service as well as counts of hospitalizations at all lengths of service. Results are shown separately for active duty enlistees, officers, and warrant officers during 1997–2001 and separately during 2002.

It can be seen that a much greater percentage of hospitalizations among enlistees occurs during the first 2 years of service compared with officers or warrant officers. For example, in year 2002, over 14% of hospitalizations of Army enlistees occurred among those who were in the first year of service. The analogous numbers for warrant officers and officers were 0.3 and 2.4, respectively.

The small percentage for warrant officers reflects the fact that individuals typically must rise through the enlisted ranks to become warrant officers; thus few achieve that level during the first 2 years of service. The greater influence of the first 2 years among enlistees compared with officers may partly reflect the tendency of enlistees to spend less time in the service than officers, i.e., a greater percentage of the enlistee force consists of individuals in the first 2 years of service. The greater physical demands of basic and advanced individual training may also contribute to this disparity.

**TABLE 2.36. ARMY ACTIVE DUTY HOSPITALIZATIONS
BY GRADE AND YEARS OF SERVICE IN 1997–2001 VS 2002**

Grade	Years of service	1997–2001		2002	
		Count	%	Count	%
Enlistees	0–1	18,155	14.1	3,636	14.3
	1–2	18,839	14.7	4,098	16.2
	All	128,361	—	25,376	—
Officers	0–1	327	2.5	54	2.4
	1–2	609	4.6	97	4.4
	All	13,222	—	2,224	—
Warrant officers	0–1	7	0.3	1	0.3
	1–2	4	0.2	0	0.0
	All	2,214	—	376	—

Hospitalization data on reserves and guard were only available for 1999–2002. Table 2.37 shows hospitalizations among the reserves, and Table 2.38 shows hospitalizations for the guard. As with the active duty numbers shown in Table 2.36, it is clear that the percentages of hospitalizations occurring during the first 2 years of service are higher among enlistees than among officers and are much higher than among warrant officers. In fact, the hospitalizations for both of these components are more heavily skewed toward the first year of service than for active duty Army enlistees.

**TABLE 2.37. ARMY RESERVE HOSPITALIZATIONS
BY GRADE AND YEARS OF SERVICE IN 1999–2001 VS 2002**

Grade	Years of service	1999–2001*		2002	
		Count	%	Count	%
Enlistees	0–1	776	47.1	190	33.1
	1–2	79	4.8	38	6.6
	All	1,649	—	574	—
Officers	0–1	12	5.4	4	3.3
	1–2	10	4.5	4	3.3
	All	221	—	121	—
Warrant officers	0–1	0	0.0	1	5.3
	1–2	0	0.0	0	0.0
	All	24	—	19	—

* HOSPITALIZATION DATA ON ARMY RESERVES WERE ONLY AVAILABLE FOR 1999–2002

**TABLE 2.38. ARMY NATIONAL GUARD HOSPITALIZATIONS
BY GRADE AND YEARS OF SERVICE IN 1999–2001 VS 2002**

Grade	Years of service	1999–2001*		2002*	
		Count	%	Count	%
Enlistees	0–1	837	44.9	333	35.2
	1–2	100	5.4	53	5.6
	All	1,863	—	945	—
Officers	0–1	2	1.5	2	3.6
	1–2	3	2.3	1	1.8
	All	132	—	56	—
Warrant officers	0–1	0	0.0	0	0.0
	1–2	0	0.0	0	0.0
	All	57	—	0	—

*HOSPITALIZATION DATA ON ARMY NATIONAL GUARD WERE ONLY AVAILABLE FOR 1999–2002

Table 2.39 compares hospitalization percentages during 1997–2001 with those in 2002 among Army active duty enlistees, warrant officers, and officers according to medical category of the primary diagnosis code. Except for “others,” the categories are taken directly from the ICD9. The “others” category represents a wide range of diagnoses that do not fit the ICD9 categories. In addition, the five categories including the word “other” cover conditions not fitting the specific categories (e.g., “other diseases of respiratory system” includes all respiratory tract diseases that do not fit into the specific respiratory conditions listed).

In both 1997–2001 and 2002, the largest medical category of hospitalizations (aside from the “others” category) was “complications of pregnancy.” The percentages in this category were considerably higher in 2001 than in 1996–2000 for each service. Injuries were the second most common reason for hospitalization, with roughly half as many as for pregnancy.

TABLE 2.39. HOSPITALIZATION PERCENTAGES BY MEDICAL CATEGORY FOR ARMY ACTIVE DUTY OF ALL GRADES IN 1997-2001 vs 2002

Category	1997-2001	2002
Complications of pregnancy	20.95	19.47
Injuries	9.88	11.60
Neurotic and personality disorders	8.53	8.51
Arthropathies and related disorders	5.51	4.26
General symptoms	4.45	5.58
Other psychoses	3.21	3.60
Alcohol and drug dependency	2.53	2.03
Appendicitis	1.88	2.25
Diseases of oral cavity	2.39	2.58
Infections of skin and subcutaneous tissue	1.63	2.26
Other diseases of respiratory system	1.31	0.96
Other diseases of urinary system	1.53	1.57
Pneumonia and influenza	1.37	2.05
Hernia of abdominal cavity	1.14	1.32
Noninfectious enteritis and colitis	1.02	1.36
Other diseases due to viruses	0.80	0.68
Acute respiratory infection	1.08	1.01
Poisonings, toxic effects	0.88	0.84
Chronic obstructive pulmonary disease	0.60	0.56
Viral diseases accompanied by exanthem	0.39	0.14
Other bacterial diseases	0.27	0.25
Others	28.66	27.10
Total	143,797	27,976

Table 2.40 compares army hospitalization percentages during 1999-2001 with those during 2002 among active duty, guard, and reserve members according to medical category of the primary diagnosis code. Hospitalization data on reservists and National Guard members are only available back to 1999 in AMSARA, hence the timeline is 1999-2002 for Table 2.40.

The comparisons across components for 2002 are similar to those for 1999-2001. However, the distribution of hospitalizations by cause differs considerably by component. In particular, hospitalizations among reserve and guard members tend to be more heavily weighted toward acute conditions than those of active duty members. This may be partly due to the fact that reserve and guard members are only eligible for military hospitalization for conditions that become a problem while on duty. Pregnancy complications, for example, are typically not an eligible cause for hospitalization for members of the reserves and guard.

TABLE 2.40. ARMY HOSPITALIZATION PERCENTAGES BY MEDICAL CATEGORY AND COMPONENT IN 1999–2002

Category	Active duty		National Guard		Reserves	
	1999–2001	2002	1999–2001	2002	1999–2001	2002
Complications of pregnancy	21.73	19.47	1.47	1.38	4.28	4.48
Injuries	9.97	11.60	11.13	13.85	9.94	9.24
Neurotic and personality disorders	9.32	8.51	10.34	6.63	11.42	8.12
Arthropathies and related disorders	5.12	4.26	2.70	2.77	2.54	1.82
General symptoms	4.38	5.58	7.65	9.20	7.77	9.10
Other psychoses	3.64	3.60	3.48	3.36	4.92	3.78
Alcohol and drug dependency	2.36	2.03	1.03	1.68	0.69	1.12
Diseases of oral cavity	2.45	2.58	1.18	1.48	0.95	2.24
Appendicitis	1.96	2.25	2.11	2.08	2.54	1.68
Infections of skin and subcutaneous tissue	1.83	2.26	4.85	5.24	3.17	3.50
Pneumonia and influenza	1.55	2.05	5.20	6.92	4.49	4.34
Other diseases of urinary system	1.40	1.57	1.13	2.37	1.43	3.36
Other diseases of respiratory system	1.06	0.96	0.98	0.99	1.22	0.00
Hernia of abdominal cavity	1.02	1.32	1.72	3.66	1.53	2.24
Noninfectious enteritis and colitis	0.89	1.36	1.42	1.58	1.64	1.68
Acute respiratory infection	1.07	1.01	2.35	1.78	2.59	1.82
Poisonings, toxic effects	0.87	0.84	0.83	0.69	0.26	0.42
Other diseases due to viruses	0.80	0.68	2.50	1.38	1.90	1.12
Chronic obstructive pulmonary disease	0.54	0.56	1.23	0.49	0.85	0.84
Viral diseases accompanied by exanthem	0.26	0.14	0.93	0.40	0.85	0.14
Other bacterial diseases	0.25	0.25	0.34	0.49	0.42	0.70
Others	27.53	27.10	35.44	31.55	34.62	38.24
Total	78,024	27,976	2,052	1,001	2094	714

Part II: With Accession, Army Active Duty Enlistees Only

The numbers of hospitalizations and the numbers of individuals hospitalized among Army enlistees who began active duty during 1997–2002 are presented in Tables 2.41–2.44. Relative risks are used to compare the likelihood of hospitalization across demographic groups. A baseline group is chosen for each comparison, and in most cases this is the largest group.

Table 2.41 shows hospitalizations and persons hospitalized among recruits accessed during each year from 1997 through 2002. The results are first presented for hospitalizations that occurred within the same year in which the recruit began active duty. This presentation forms a fair basis of comparison for those gained in 2002, because hospitalization data were only available through 2002, allowing less than a full year of follow-up for this group. Results are also shown for each accession year group with a full year of follow-up on each individual.

It appears from the hospitalization percentages within the same year as accession that the percentage of new enlistees being hospitalized early in service has been increasing slightly over the period shown. The only exception is 1997, which is misleading because of missing gain data for the latter part of that year. The pattern is less clear when examining hospitalization rates after one full year of follow-up on all enlistees.

TABLE 2.41. HOSPITALIZATIONS FOR ARMY ACTIVE DUTY ENLISTEES BY ACCESSION YEAR: 1997–2002

Year	Total accessed	Within gain year			Within 1 year of service		
		Count	Persons	% of accessions	Count	Persons	% of persons
1997	39,932*	1,964*	1,696*	4.25*	2,668	2,256	5.65
1998	51,049	1,379	1,214	2.38	2,544	2,169	4.25
1999	61,095	1,717	1,546	2.53	3,242	2,816	4.61
2000	61,080	1,895	1,703	2.79	3,239	2,827	4.63
2001	60,297	1,840	1,666	2.76	3,158	2,772	4.60
2002	57,211	1,840	1,654	2.89	NA	NA	NA

* Accessions data were incomplete for the second half of 1997, so those with an accession record have, on average, a longer length of follow-up within the same gain year for those with an accession record.

Tables 2.42–2.44 summarize numbers of hospitalizations and numbers of individuals hospitalized within 1 year of accession by demographic groups among Army enlisted personnel beginning duty during 1997–2002. Note that these numbers and percentages are slight underestimates, because follow-up data for recruits who were accessed in 2002 were incomplete.

Females and older recruits had a higher likelihood of hospitalization than their male and younger counterparts, respectively. Whites were about equally likely to be hospitalized as blacks, but had higher hospitalization likelihood than other non-whites. There was only a slight difference in hospitalization likelihood by education level, with those having a high school diploma being at lower risk for hospitalization compared with those without a diploma. Those with a bachelor's degree or more were also at lower risk, although the numbers of enlistees in this group were fairly small. Finally, recruits in the 93–99 percentile group on the AFQT had a lower likelihood of hospitalization than those in the 65–92 and 50–64 percentile groups but a higher risk than those in the 0–29 percentile group.

**TABLE 2.42. HOSPITALIZATIONS WITHIN 1 YEAR OF ACCESSION
FOR ARMY ACTIVE DUTY ENLISTEES ACCESSED IN 1997–2002: GENDER**

Gender	Enlisted accessions	Hospital admissions	Persons hospitalized			
			Count	Hos.Rate	Relative risk	95% CI
Male	264,166	11,947	10,385	3.93	1.00	
Female	66,496	4,751	4,116	6.19	1.57	1.52, 1.63

**TABLE 2.43. HOSPITALIZATIONS WITHIN 1 YEAR OF ACCESSION
FOR ARMY ACTIVE DUTY ENLISTEES ACCESSED IN 1997–2002: AGE**

Age	Enlisted accessions	Hospital admissions	Persons hospitalized			
			Count	Hos.Rate	Relative risk	95% CI
17–20 yr	229,959	11,045	9,664	4.20	1.00	
21–25 yr	77,192	4,171	3,583	4.64	1.10	1.06, 1.15
26–30 yr	18,257	1,140	966	5.29	1.26	1.18, 1.34
>30 yr	5,256	342	288	5.48	1.30	1.16, 1.46

**TABLE 2.44 HOSPITALIZATIONS WITHIN 1 YEAR OF ACCESSION
FOR ARMY ACTIVE DUTY ENLISTEES ACCESSIONED IN 1997–2002: RACE**

Race	Enlisted accessions	Hospital admissions	Persons hospitalized			
			Count	Hos.Rate	Relative risk	95% CI
White	229,275	11,775	10,210	4.45	1.00	
Black	72,480	3,635	3,141	4.33	0.97	0.94, 1.01
Other	28,909	1,288	1,150	3.98	0.89	0.84, 0.95

**TABLE 2.45. HOSPITALIZATIONS WITHIN 1 YEAR OF ACCESSION
FOR ARMY ACTIVE DUTY ENLISTEES ACCESSIONED IN 1997–2002: EDUCATION LEVEL**

Education level	Enlisted accessions	Hospital admissions	Persons hospitalized			
			Count	Hos.Rate	Relative risk	95% CI
Below HS	22,574	1,248	1,077	4.77	1.00	
HS diploma	290,970	14,642	12,716	4.37	0.92	0.86, 0.97
Some college	7,279	376	324	4.45	0.93	0.83, 1.05
Bachelor's and above	9,349	411	366	3.91	0.82	0.73, 0.92

**TABLE 2.46. HOSPITALIZATIONS WITHIN 1 YEAR OF ACCESSION
FOR ARMY ACTIVE DUTY ENLISTEES ACCESSIONED IN 1997–2002: AFQT SCORE**

AFQT score	Enlisted accessions	Hospital admissions	Persons hospitalized			
			Count	Hos.Rate	Relative risk	95% CI
93–99	15,823	694	615	3.89	1.00	
65–92	110,634	5670	4945	4.47	1.15	1.06, 1.25
50–64	96,662	5134	4435	4.59	1.18	1.09, 1.28
30–49	101,860	4888	4242	4.16	1.07	0.99, 1.16
1–29*	5,592	243	213	3.81	0.98	0.84, 1.14

* Over one third of the enlistees in this category entering the service in 2002, hence the rate was underestimates due to incomplete follow up time.

Table 2.47 shows the numbers of hospitalizations by medical category among active duty enlistees within the first year and the first 2 years of service during 1997–2002. The most common reason for hospitalization among enlistees is complications related to “neurotic and personality disorders.” This category accounted for more than double the number of hospital admissions as the second largest medical category (“injuries”) during the first year of service and nearly double the number of persons hospitalized.

When the follow-up is through the first 2 years of service, the relative sizes of the medical categories change somewhat. For example, the numbers of injury hospitalizations (and persons hospitalized) is nearly double that seen after 1 year of follow-up, whereas the numbers for “pneumonia and influenza” are almost the same after 2 years as after 1 year of follow-up. Presumably, enlistees are at a similar level of risk for serious injuries over the first 2 years of service, but the risk of pneumonia and influenza decreases after early service, perhaps as the enlistees become less likely to be in barracks or other group-living situations.

The numbers of hospitalizations for neurotic and personality disorders increases with the 2-year follow-up but is clearly less than double that after 1 year of follow-up. A previous AMSARA

study has found that those enlistees experiencing a serious mental illness-related episode early in training are discharged soon after. It appears that a large portion of such mental problems manifest during the first year of service.

TABLE 2.47. HOSPITALIZATIONS AND PERSONS HOSPITALIZED WITHIN 1 AND 2 YEARS OF SERVICE BY MEDICAL CATEGORY FOR ARMY ACTIVE DUTY ENLISTEES ACCESSED IN 1997–2002

Category	Within 1 year of accession		Within 2 years of accession	
	Hospital admissions	Persons hospitalized	Hospital admissions	Persons hospitalized
Neurotic and personality disorders	3,844	3,224	5,516	4,429
Injuries	1,764	1,643	3,307	2,976
Pneumonia and influenza	1,014	959	1,084	1,016
Other psychoses	926	725	1,480	1,013
Symptoms	741	632	1,122	913
Infections of skin	728	670	931	840
Acute respiratory infections	685	633	794	728
Other diseases due to virus	467	441	552	512
Complication of pregnancy	466	391	5,196	4,380
Alcohol and drug dependency	371	283	825	618
Appendicitis	301	289	553	520
Poisoning, toxic effects	289	240	459	373
Diseases of oral cavity	266	251	593	545
Noninfectious enteritis	245	214	371	308
Hernia of abdominal cavity	239	231	331	314
Other diseases of urinary system	232	203	385	319
Arthropathies and related disorders	225	199	700	597
Other diseases of respiratory system	207	184	366	314
Chronic obstructive pulmonary disease and allied conditions	189	171	240	213
Viral diseases accompanied by exanthem	167	159	202	191
Other bacterial diseases	155	143	175	160
Total	16,698	14,501	30,525	25,487

EPTS Discharges of Enlistees

Discharges for EPTS medical conditions are of vital interest to AMSARA. A discharge for a medical condition can be classified as EPTS if the condition was verified to have existed before the recruit began service and if the complications leading to discharge arose no more than 180 days after the recruit began duty. As was discussed under “Data Sources,” EPTS data reporting has varied both by site and over time within sites. The numbers shown below should be reviewed in the context of these data shortcomings.

Part I summarizes the numbers of EPTS records provided to AMSARA, irrespective of whether a corresponding accession record is available. These include EPTS records for active duty, reserves, and National Guard members. Part II summarizes only those records for which a corresponding accession record is available. Accordingly, only discharges among active duty enlistees are included.

Part I: Irrespective of Accession Record

Included among the EPTS records provided to AMSARA are records for recruits in basic training for service in the reserves or guard, for which AMSARA does not currently hold accessions data. In addition, some active duty enlistee EPTS records do not have a matching accession record. Accordingly, the tables in part I show the numbers of EPTS discharge records provided by the basic training sites, irrespective of whether a corresponding accession record is available to AMSARA.

Table 2.48 shows the numbers of EPTS discharge records by service branch, service component, and year during 1997–2002. It is clear that with few exceptions the numbers of EPTS discharges are not stable over the time examined for any component in any service. For example, the number of records received for the Navy active duty was <2,200 in 1996, rose to more than twice that number (5,126) in 1998, and then dropped to just over 1,800 in 2001.

The numbers of records received for the Navy reserve were low over the period, with only one record in both 2000 and 2001. Similarly, the numbers of records provided by the Marines fluctuated dramatically for both active duty and reserve members. Finally, the Air Force active duty numbers were fairly stable until 1999, when reporting of EPTS discharges dropped dramatically. After low numbers in 2000 and 2001, the numbers of records provided for 2002 have returned to a more plausible level.

Although the numbers for the Army, particularly the active duty component, appear relatively stable, reporting by site has fluctuated considerably over this period (see Table 4.1). Therefore the apparent stability for the Army as a whole does not reflect full reporting.

The shortcomings of the EPTS data, including those on reserve and guard members, should be remembered when examining and interpreting EPTS discharge data.

TABLE 2.48. EPTS DISCHARGES FOR ENLISTED PERSONNEL BY SERVICE AND COMPONENT IN 1997–2002*

Service	Component	1997	1998	1999	2000	2001	2002	Total
Army	Active duty	3,761	3,646	3,040	3,384	3,095	3,287	20,213
	Guard	846	1,022	775	668	557	502	4,370
	Reserves	556	642	456	465	406	223	2,748
Navy	Active duty	3,190	5,125	2,537	1,870	1,823	1,815	16,360
	Reserves	16	22	10	1	1	2	52
Marines	Active duty	1,627	1,469	1,232	1,057	890	1,093	7,308
	Reserves	167	127	101	109	84	73	661
Air Force†	Active duty	974	1,016	929	203	257	753	4,132
	Guard	16	57	34	12	5	3	127
	Reserves	24	40	47	8	8	26	153
Total		11,177	13,166	9,161	7,777	7,126	7,777	56,124

* Data reporting incomplete (see Section 4).

† Air Force did not provide EPTS discharge records in April 2000–September 2001.

Table 2.49 shows EPTS discharges among active duty enlistees according to the medical categories utilized by MEPCOM. The medical categories are sorted according to their numbers

of discharge from the Army, the largest service and the one with the most EPTS discharges. Asthma and orthopedic conditions (i.e., feet, knee, back, other) are major causes of EPTS discharges reported in all services. Psychiatric conditions were the most common causes of EPTS discharges reported for the Navy and Marines: 46.6% and 36.2%, respectively. Note that services differ considerably in how they categorize and report EPTS discharges. Accordingly, differences across services may reflect procedural differences more than true EPTS rates, and any comparisons across services are tenuous, at best.

TABLE 2.49. EPTS DISCHARGES FOR ACTIVE DUTY ENLISTEES IN 1997–2002 BY CAUSE AND SERVICE

Category	Army		Navy		Marines		Air Force*	
	Count	%	Count	%	Count	%	Count	%
Asthma	3,281	16.2	1,718	10.5	805	11.0	949	23.0
Psychiatric—other	2,986	14.8	7,629	46.6	2,649	36.2	92	2.2
Orthopedics—other	2,651	13.1	984	6.0	805	11.0	460	11.1
Orthopedics—feet	2,514	12.4	438	2.7	264	3.6	435	10.5
Orthopedics—knee	2,303	11.4	811	5.0	497	6.8	640	15.5
Orthopedics—back	1,929	9.5	574	3.5	303	4.1	452	10.9
Other	903	4.5	950	5.8	376	5.1	300	7.3
Genitourinary system	716	3.5	476	2.9	182	2.5	114	2.8
Neurology—other	580	2.9	610	3.7	327	4.5	233	5.6
Abdomen and viscera	445	2.2	209	1.3	169	2.3	95	2.3
Cardiovascular—other	359	1.8	285	1.7	156	2.1	75	1.8
Skin/lymphatic	334	1.7	325	2.0	114	1.6	47	1.1
Vision/refraction	250	1.2	323	2.0	71	1.0	59	1.4
Chest/lung—other	248	1.2	128	0.8	90	1.2	48	1.2
Seizure disorder	207	1.0	145	0.9	83	1.1	40	1.0
Eyes—other	189	0.9	351	2.1	103	1.4	62	1.5
Hypertension	133	0.7	88	0.5	74	1.0	11	0.3
Ears—hearing	116	0.6	139	0.8	176	2.4	12	0.3
Schizophrenia	37	0.2	43	0.3	11	0.2	1	0.0
Ears—other	32	0.2	134	0.8	53	0.7	7	0.2
Total	20,213	100.	16,360	100.	7,308	100.	4,132	100.

* Air Force did not provide records for discharges from April 2000 to September 2001, so the 1996–2001 aggregate numbers for Air Force are underestimates.

The medical causes of EPTS discharges for each service are more thoroughly examined by medical condition using the subset of ICD9 codes listed in DoD Instruction 6130.3. Tables 2.50–2.53 summarize the primary EPTS discharge diagnoses for 1998–2002. (These detailed diagnosis codes are unavailable before 1998.)

Table 2.50 shows the top 20 conditions leading to EPTS discharge in the Army during 1998–2002. Asthma, psychological conditions, and orthopedic conditions were the most common conditions underlying the reported EPTS discharges. The numbers of reported discharges have fluctuated over these years, including a dramatic increase in “neurotic, mood, somatoform, dissociative, or factitious disorder,” although the numbers of discharges for this condition dropped in 2002.

Conversely, the numbers of EPTS records listing “flat feet” and “chondromalacia of patella or retropatellar knee pain syndrome” as the primary discharge cause declined steadily. Possible

reasons for these fluctuations include discharge policy changes, data reporting changes, and random fluctuations in recruit health status.

TABLE 2.50. TOP 20 PRIMARY EPTS DISCHARGE DoD DIAGNOSES FOR ENLISTEES OF ALL COMPONENTS IN 1998–2002: ARMY^a

DoD code	Definition	1998	1999	2000	2001	2002*
493	Asthma	571	408	526	565	666
300	Neurotic, anxiety, mood, somatoform, dissociative, or factitious disorders	150	230	392	465	329
719.4	Chronic pain in joint of lower extremities	253	226	267	232	273
724	Spine and sacroiliac joints	261	205	178	159	210
905.2	Upper extremity deformities, injury, weakness, insufficient recovery, disease	98	96	110	111	161
718.1	Shoulder instability of any major joint	58	50	67	57	88
784	Headaches, recurrent, all types	73	41	50	49	81
734, 754.6	Flat feet	265	189	253	102	74
717.7	Chondromalacia of patella or retropatellar knee pain syndrome	128	114	107	54	64
345	Epilepsy, including seizures	43	38	34	37	61
717.9	Unstable or internally deranged joint	69	45	52	34	48
796	Miscellaneous	29	29	19	21	43
905.4	Lower extremity deformities, injury, weakness, insufficient recovery, disease	77	80	69	62	41
746	Other congenital anomalies of heart	21	12	9	14	40
732.4	Osgood-Schlatter disease	64	33	42	34	38
737	Deviation or curvature of spine	75	56	52	40	37
313	Behavior disorders	38	41	69	67	35
V22	Pregnancy	22	28	37	34	34
314	Academic skills defects	26	33	27	28	31
354	Mononeuritis of upper limb and mononeuritis multiplex	20	24	13	12	27
	All others	1,305	1,062	1,011	918	906
	Total	3,646	3,040	3,384	3,095	3,287

^aEPTS data reporting from the five Army basic training sites has fluctuated over the time period included. See "Data Sources" for details.

* Sorted by counts in 2002

Table 2.51 shows the top 20 primary conditions leading to EPTS discharge among Navy recruits during 1998–2002, with categories determined by the subset of ICD9 codes listed in DoD Instruction 6130.3. Psychological/behavioral disorders and asthma lead the list. The numbers of reported discharges are unstable for this 5-year period. For example, the numbers of EPTS discharges for "personality disorders" went from a high of 581 in 1998 to a low of 130 in 2000, a 78% drop in just 2 years.

In fact, the numbers for 1998 are generally much higher than for the other years for most of the listed conditions. This reflects the overall high numbers of reported EPTS discharges from the Navy for 1998 seen in Table 2.51. Notable exceptions are for "disease or chronic pain of one or both lower extremities," which shows a spike in 2000, and "muscular paralysis, contracture, or atrophy," which shows a dramatic upward spike in 2001.

TABLE 2.51. TOP 20 PRIMARY EPTS DISCHARGE DOD DIAGNOSES FOR ENLISTEES OF ALL COMPONENTS IN 1998–2002: NAVY^a

DoD code	Definition	1998	1999	2000	2001	2002*
301	Personality disorders	581	167	130	136	268
300	Neurotic, mood, somatoform, dissociative, or factitious disorder	732	262	168	109	212
313	Behavior disorders	810	104	87	100	152
493	Asthma	507	381	206	119	147
314	Academic skills defects	169	62	26	21	67
719.4	Disease or chronic pain of lower extremities	46	48	102	132	45
304	Drug dependence	108	75	32	14	43
312	Disturbance of conduct	62	29	27	18	40
303	Alcohol dependence	302	133	38	15	38
305	Alcohol abuse including other nondependent use of drugs	95	39	12	10	38
V22	Pregnancy	45	42	49	57	38
307.6	Enuresis up to age 12	95	27	15	24	31
784	Headaches, recurrent, all types	122	92	48	27	29
724	Spine and sacroiliac joints	56	34	56	46	28
734, 754.6	Flat feet	60	12	16	44	26
389	Hearing loss	13	16	25	23	25
737	Deviation or curvature of spine	46	39	24	27	24
780.2	Syncope	32	30	22	20	22
401	Hypertensive vascular disease	18	13	15	19	21
728	Muscular paralysis, contracture, or atrophy	7	22	31	92	20
	All others	1,219	910	741	770	501
	Total	5,125	2,537	1,870	1,823	1,815

^aEPTS data reporting from the Navy basic training site has fluctuated over the time period included. See "Data Sources" for details.

* Sorted by counts in 2002

Table 2.52 shows the top 20 conditions leading to EPTS discharge among Marine recruits during 1998–2002. Many of the most common reasons for EPTS discharge among the Marines were psychological in nature. The most common specific condition in 2002, and in 1998–2002 as a whole, was "neurotic, mood, somatoform, dissociative, or factitious disorder." Asthma was the next most common in both 2002 and in 1998–2002.

The third most common EPTS condition for active duty enlisted Marines was suicide attempt/behavior, although the numbers of records reported for this category declined. Informal review of these records indicated that most were related to behavior rather than actual attempts. Anecdotal evidence suggests that the services take a risk-averse approach to suicide threats, preferring to allow release of all who make such threats rather than risk an actual suicide. This may lead to increased suicide threats by recruits seeking an escape from the rigors of basic training.

The numbers of EPTS records changed markedly over this period in certain categories. This may be partly due to fluctuations in overall data reporting over the period examined. Further

scrutiny would be required to determine the reasons for these dramatic changes in reported discharge numbers.

TABLE 2.52. TOP 20 PRIMARY EPTS DISCHARGE DoD DIAGNOSES FOR ENLISTEES OF ALL COMPONENTS IN 1998–2002: MARINES[^]

DoD code	Definition	1998	1999	2000	2001	2002*
300	Neurotic, mood, somatoform, dissociative, or factitious disorder	169	120	102	130	191
493	Asthma	126	138	126	155	165
300.9	Suicide (attempted or suicidal behavior)	251	156	66	89	69
784	Headaches, recurrent, all types	45	24	35	20	55
314	Academic skills defects	40	25	14	15	32
301	Personality disorders	27	22	16	20	30
401	Hypertensive vascular disease;	10	10	6	20	22
724	Spine and sacroiliac joints	27	27	36	21	22
995.0	Allergic manifestations	17	15	6	12	21
719.4	Disease or chronic pain of lower extremities	48	51	47	26	20
345	Epilepsy (including seizures)	26	14	14	6	19
831	Shoulder dislocation	30	29	16	18	19
304	Drug dependence	6	5	0	1	17
389	Hearing loss	44	34	33	28	17
786.5	Chest pain	17	12	7	13	14
796	Other nonspecific abnormal findings	7	9	11	8	13
905.2	Upper extremity deformities, injury, weakness, insufficient recovery, disease	25	17	27	20	13
307.6	Enuresis	11	14	5	4	11
746	Other congenital anomalies of heart	10	13	12	7	11
303	Alcohol dependence syndrome	5	8	2	4	10
	All other	468	489	476	273	321
	Total	1,409	1,232	1,057	890	1,093

[^]EPTS data reporting from the two Marines basic training sites has fluctuated over the time period included. See "Data Sources" for details.

* Sorted by counts in 2002

Table 2.53 shows the top 20 primary conditions leading to EPTS discharge among Air Force recruits during 1998–2002. The numbers for 2000–2001 are unreliable because the Air Force provided few data on EPTS discharges in that year.

Asthma was the most common cause, with 272 reported EPTS discharges in 2002. Second and third on the list, with numbers considerably lower than those for asthma, were "disease or chronic pain of lower extremities" and "spine and sacroiliac joints." Note that no psychological conditions appear among the leading causes in any year, most likely reflecting a difference in Air Force categorization.

TABLE 2.53. TOP 20 PRIMARY EPTS DISCHARGE DoD DIAGNOSES FOR ENLISTEES OF ALL COMPONENTS IN 1998–2002: AIR FORCE

DoD code	Definition	1998	1999	2000*	2001*	2002^
493	Asthma	227	184	34	79	272
719.4	Disease or chronic pain of lower extremities	98	116	9	23	65
724	Spine and sacroiliac joints	95	101	15	17	49
734, 754.6	Flat feet	49	12	8	10	39
717.7	Chondromalacia of patella or chronic retropatellar knee pain syndrome	43	47	7	5	32
784	Headaches, recurrent, all types	54	56	8	7	28
905.2	Upper extremity deformities, injury, weakness, insufficient recovery, disease	32	22	5	1	14
367	Disorders of refraction and accommodation	4	5	3	4	8
371.6	Keratoconus	9	2	2	0	8
728	Disorders of muscle, ligament and fascia	1	4	3	0	8
732.4	Juvenile osteochondrosis of lower extremity, excluding foot	4	8	2	5	8
905.4	Lower extremity deformities, injury, weakness, insufficient recovery, disease	25	13	3	2	8
717.83	Old disruption of anterior cruciate ligament	2	6	2	4	7
717.9	Unstable or internally deranged joint	17	9		1	7
737	Deviation or curvature of spine	10	8	2	4	7
780.2	Syncope	11	6	4	1	7
345	Epilepsy, including seizures	13	9	4	1	6
550	Inguinal hernia	10	7	4	5	6
786.5	Chest pain	9	12	3	0	6
282	Hereditary hemolytic anemias	6	10	1	5	5
	All other	297	292	84	83	163
	Total	1,016	929	203	257	753

* Air Force did not provide records for EPTS discharges that occurred in April 2000–September 2001.

^ Sorted by counts in 2002

Part II: With Accession

EPTS discharges among recruits accessed during 1997–2002 are summarized in Tables 2.54–2.60. Note that all references to years in these tables refer to the year of accession rather than year of discharge. Discharge numbers reflect only discharges occurring among individuals with an accession record.

Relative risks are used to compare likelihood of EPTS discharge between demographic groups. A baseline group is chosen for each comparison, and in most cases this is the largest group. All comparisons, particularly those by service branch, should be taken in light of the EPTS data reporting fluctuations by service and over time (see Table 4.1).

Table 2.54 shows EPTS discharges reported among individuals accessed into enlisted service during each year from 1997 through 2002. The numbers of EPTS discharges reported during

2000, 2001, and 2002 are considerably lower than the numbers reported in previous years, whereas the numbers of accessions were generally higher during these years.

TABLE 2.54. EPTS DISCHARGES FOR ACTIVE DUTY ENLISTEES BY ACCESSION YEAR

Year	Total accessed	Discharged	% Discharged
1997	140,338	6,987	4.98
1998	132,846	7,766	5.85
1999	170,092	6,770	3.98
2000	175,484	5,363	3.06
2001	165,472	4,693	2.84
2002	163,855	5,173	3.16

Table 2.55 shows numbers of accessions and subsequent EPTS discharges reported by service over 1997–2002. Relative to Army enlistees, the percentage of accessions ending in a reported EPTS discharge is significantly higher among Navy enlistees and significantly lower among Marines and Air Force enlistees. However, EPTS reporting is not uniform across all services or even across different basic training sites within the same service (see “EPTS Discharges” in Section 4). Moreover, the services differ regarding which discharges are classified as EPTS. Therefore, differences observed between services may more reflect procedural or reporting differences than actual differences of discharge likelihood.

TABLE 2.55. ACTIVE DUTY ENLISTED ACCESSIONS IN 1997–2002 ENDING IN EPTS DISCHARGE: SERVICE

Service	Total accessed	Discharged ^a	% Discharged ^a	Relative risk ^a	95% CI ^a
Army	330,664	14,071	4.26	1.00	
Navy	251,325	12,922	5.14	1.21	1.18, 1.24
Marines	180,763	6,105	3.38	0.79	0.77, 0.82
Air Force*	185,335	3,654	1.97	0.46	0.45, 0.48

^aInterservice comparisons are tenuous, at best, due to inconsistent EPTS data reporting from each service’s basic training over the time period included. See “Data Sources” for details.

* Air Force did not provide records for discharges in April 2000–September 2001, so the discharge rate and relative risk for Air Force are underestimates.

Table 2.56 shows the numbers of accessions, and subsequent EPTS discharges reported by gender. The relative risk of EPTS discharges is higher among female enlistees.

TABLE 2.56. ACTIVE DUTY ENLISTED ACCESSIONS ENDING IN EPTS DISCHARGE IN 1997–2002: GENDER

Gender	Total accessed	Discharged	% Discharged	Relative risk	95% CI
Male	776,180	27,931	3.60	1.00	
Female	171,905	8,821	5.13	1.43	1.39, 1.46

Table 2.57 shows the numbers of accessions, and subsequent EPTS discharges reported by age at accession. The relative risk of EPTS discharge increases with age at the time of accession.

TABLE 2.57. ACTIVE DUTY ENLISTED ACCESSIONS ENDING IN EPTS DISCHARGE IN 1997–2002: AGE

Age	Total accessed	Discharged	% Discharged	Relative risk	95% CI
17–20 yr	731,612	27,131	3.71	1.00	
21–25 yr	175,334	7,573	4.32	1.16	1.14, 1.19
26–30 yr	32,832	1,637	4.99	1.34	1.28, 1.41
>30 yr	8,309	411	4.95	1.33	1.21, 1.47

Table 2.58 shows the numbers of accessions, and subsequent EPTS discharges reported by race. The relative risk of EPTS discharge is significantly lower for blacks and for other nonwhites compared with whites.

TABLE 2.58. ACTIVE DUTY ENLISTED ACCESSIONS ENDING IN EPTS DISCHARGE IN 1997–2002: RACE

Race	Total accessed	Discharged	% Discharged	Relative risk	95% CI
White	670,645	28,149	4.20	1.00	
Black	177,450	5,813	3.28	0.78	0.76, 0.80
Other	99,989	2,790	2.79	0.66	0.64, 0.69

Table 2.59 shows the numbers of accessions and subsequent EPTS discharges reported by education level at the time of accession. The relative risk of EPTS discharge decreases as the level of education increases.

TABLE 2.59. ACTIVE DUTY ENLISTED ACCESSIONS ENDING IN EPTS DISCHARGE IN 1997–2002: EDUCATION LEVEL

Education level	Total accessed	Discharged	% Discharged	Relative risk	95% CI
Below HS	48,973	2,374	4.85	1.00	
HS diploma	854,471	33,087	3.87	0.80	0.77, 0.83
Some college	28,566	875	3.06	0.63	0.59, 0.68
Bachelor's and above	15,171	395	2.60	0.54	0.48, 0.60

Table 2.60 shows the numbers of accessions and subsequent EPTS discharges reported by AFQT percentile score groups. The relative risk of EPTS discharge is roughly the same in the lowest (0–29) score group as in the highest. The relative risk of EPTS is significantly higher in the middle percentile groups (30–49, 50–64, and 65–92) compared with the highest score group.

TABLE 2.60. ACTIVE DUTY ENLISTED ACCESSIONS ENDING IN EPTS DISCHARGE IN 1997–2002: AFQT SCORE

AFQT score	Total accessed	Discharged	% Discharged	Relative risk	95% CI
93–99	55,219	1,643	2.98	1.00	
65–92	402,455	14,598	3.63	1.22	1.16, 1.28
50–64	311,949	13,407	4.30	1.44	1.37, 1.52
30–49	328,340	14,534	4.43	1.49	1.41, 1.56
1–29*	11,620	555	4.78	1.61	1.46, 1.76

* Over one third of the enlistees in this category entering the service in 2002, hence the rate was underestimated due to incomplete follow up time.

Disability Discharges among Army Active Duty Enlistees

Data on disability discharge considerations are compiled separately for each service by its disability agency. The Army agency has provided data on all disability discharge considerations during 1997–2002 and continues to provide these data. The Air Force has provided such data in the past but could not transmit data for discharges during 2002. The Navy/Marines agency has provided data only on a diagnosis-specific request basis rather than for all actions. Consequently, only Army disability discharge data are summarized.

Part I: Without Accession Records

Table 2.61 summarizes disability discharges in 1997–2001 and separately in 2002 among Army active duty enlistees by medical category. These numbers are presented irrespective of accession records, so the years shown refer to the year of discharge. The individuals being discharged could have been in the service for any number of years. Medical diagnosis categories are taken from the Veterans Administration Schedule for Rating Disabilities (see “Disability” in Section 4).

Clearly the largest category, accounting for over 65% of reported disability discharges in both 1997–2001 and 2002, is “musculoskeletal system, muscle injuries.” A distant second category is “diseases of the trachea and bronchi,” accounting for 5% of such discharges during 1997–2001 and 6% of those in 2002. Every other diagnosis category accounted for <3% of disability discharges.

TABLE 2.61. DIAGNOSIS CATEGORIES OF DISABILITY DISCHARGES FOR ARMY ACTIVE DUTY ENLISTEES IN 1997–2001 vs 2002

Diagnosis category	1997–2001		2002	
	Count	%	Count	%
Musculoskeletal system, muscle injuries	20,252	67.8	3,303	69.1
Diseases of trachea and bronchi	1,487	5.0	308	6.4
Psychotic*, mental organic†, and psychoneurotic§ disorders	743	2.5	103	2.2
Organic diseases of central nervous system	612	2.0	72	1.5
Endocrine system	328	1.1	45	0.9
Systemic condition	244	0.8	15	0.3
Diseases of eye, impairment of muscle function	149	0.5	20	0.4
Hemic and lymphatic systems	148	0.5	19	0.4
Heart	139	0.5	21	0.4
Diseases of genitourinary system	129	0.4	11	0.2
All other	5,657	18.9	864	18.1
Total	29,888	100.0	4,781	100.0

* Schizophrenia, bipolar disorder, major depression, paranoid disorders, and psychoses.

† Various dementias.

§ Generalized anxiety disorders; psychogenic amnesia; psychogenic fugue; multiple personality disorder; conversion disorder; psychogenic pain disorder; phobic, obsessive compulsive dysthymic, adjustment, depersonalization, and posttraumatic disorders; and hypochondriasis.

Part II: With Accession Records

The numbers of discharges for medical disability among Army recruits accessed during 1997–2002 are presented in Tables 2.62–2.67. Relative risks are used to compare likelihood of disability discharge between demographic groups. A baseline group is chosen for each comparison, and in most cases this is the largest group. Disability discharge data were unavailable for the Air Force, Marines, and Navy (see “Disability” in Section 4).

Table 2.62 shows the numbers of disability discharges reported among individuals accessed into enlisted service during each year from 1997 through 2002. Results are shown for each accession year group with a full year of follow-up on each individual.

It is seen that the disability discharge percentages are increasing over the time shown. For those enlistees accessed in 1997, the percentage receiving disability discharge within 1 year of enlistment is 0.49. The percentage increases steadily by year to a high of 0.75% among enlistees accessed in 2001. Note that the rate is not shown for enlistees accessed in 2002, because follow-up data are only through the end of 2002, leaving less than a full year for these individuals.

TABLE 2.62. DISABILITY DISCHARGES FOR ARMY ACTIVE DUTY ENLISTED PERSONNEL WITHIN 1 YEAR OF SERVICE BY ACCESSION YEAR: 1997–2002

Year	Total accessed	Discharged within 1 year of service	% Discharged
1997	39,932†	195	0.49
1998	51,049	275	0.54
1999	61,095	386	0.63
2000	61,080	396	0.65
2001	60,297	454	0.75
2002	57,211	N/A*	N/A*
Total	330,664		

† Accessions data were incomplete for the second half of 1997, so those with an accession record have, on average, a longer length of follow-up within the same gain year for those with an accession record.

* Follow-up is only through end of 2002, so a full year of follow-up on enlistees accessed in 2002 is not possible.

Tables 2.63–2.67 show the percentages of accessions ending in disability discharge within the first year of service by different demographic factors. Females had more than double the risk of males for disability discharge. Likelihood of disability discharge within the first year of service increased by increasing age group, with those who were older than age 30 at accession having over 3.5 times the risk of those entering at age 17–20 years. Whites were more likely than blacks or others to have an early disability discharge.

TABLE 2.63. ARMY ACTIVE DUTY ENLISTED ACCESSIONS ENDING IN DISABILITY DISCHARGE WITHIN 1 YEAR OF SERVICE IN 1997–2002: GENDER

Gender	Total accessed	Discharged within 1 year of accession	% Discharged	Relative risk	95% CI
Male	264,166	1,173	0.44	1.00	
Female	66,496	707	1.06	2.39	2.18, 2.63

**TABLE 2.64. ARMY ACTIVE DUTY ENLISTED ACCESSIONS ENDING
IN DISABILITY DISCHARGE WITHIN 1 YEAR OF SERVICE IN 1997–2002: AGE**

Age	Total accessed	Discharged within 1 year of accession	% Discharged	Relative risk	95% CI
17–20 yr	229,959	1,096	0.48	1.00	
21–25 yr	77,192	529	0.69	1.44	1.30, 1.59
26–30 yr	18,257	166	0.91	1.91	1.62, 2.24
>30 yr	5,256	89	1.69	3.55	2.87, 4.40

**TABLE 2.65. ARMY ACTIVE DUTY ENLISTED ACCESSIONS ENDING
IN DISABILITY DISCHARGE WITHIN 1 YEAR OF SERVICE IN 1997–2002: RACE**

Race	Total accessed	Discharged within 1 year of accession	% Discharged	Relative risk	95% CI
White	229,275	1,443	0.63	1.00	
Black	72,480	318	0.44	0.70	0.62, 0.79
Other	28,909	119	0.41	0.65	0.54, 0.79

Table 2.66 shows the numbers and likelihood of disability discharge within the first year of service by education level at the time of accession. It is seen that those who began service without having completed high school had the lowest risk of early disability discharge. By comparison, those who had completed high school, those who had finished some college, and those with a college degree at the time of accession had significantly higher relative risk of disability discharge. These findings are likely related to the earlier finding that younger applicants are at lower risk for early disability discharge.

**TABLE 2.66. ARMY ACTIVE DUTY ENLISTED ACCESSIONS ENDING
IN DISABILITY DISCHARGE WITHIN 1 YEAR OF SERVICE IN 1997–2002: EDUCATION LEVEL**

Education level	Total accessed	Discharged within 1 year of accession	% Discharged	Relative risk	95% CI
Below HS	22,574	100	0.44	1.00	
HS diploma	290,970	1,655	0.57	1.28	1.05, 1.57
Some college	7,279	60	0.82	1.86	1.35, 2.56
Bachelor's and above	9,349	64	0.68	1.55	1.13, 2.11

Table 2.67 shows the numbers and likelihood of disability discharge within the first year of service by AFQT percentile score. The only group at significantly different risk of early disability discharge was the lowest percentile range group, which was at lower risk of early disability discharge.

**TABLE 2.67. ARMY ACTIVE DUTY ENLISTED ACCESSIONS ENDING
IN DISABILITY DISCHARGE WITHIN 1 YEAR OF SERVICE IN 1997–2002: AFQT SCORE**

AFQT score	Total accessed	Discharged within 1 year of accession	% Discharged	Relative risk	95% CI
93–99	15,823	79	0.50	1.00	
65–92	110,634	693	0.63	1.25	0.99, 1.58
50–64	96,662	550	0.57	1.14	1.90, 1.44
30–49	101,860	534	0.52	1.05	0.83, 1.33
1–29*	5,592	18	0.32	0.64	0.39, 1.07

* Over one third of the enlistees in this category entering the service in 2002, hence the rate was underestimates due to incomplete follow up time.

3. FUTURE DELIVERABLES

Assessment of Recruit Motivation and Strength (ARMS): Impact of Army Minimum Physical Performance Standards Before Shipping to IET

Despite in-depth histories and physical examinations at the MEPS, more than 3,000 Army recruits receive EPTS medical discharges each. Previous AMSARA studies have demonstrated that over 70% of those discharges willfully concealed their condition to gain entrance into the military.

In addition, 4% of males and 15% of females fail to pass the minimum fitness test when they first arrive at IET. The poor physical fitness of incoming recruits contributes to more than 2,000 serious injuries and at least 1,000 discharges annually at Fort Jackson alone. AMSARA proposes an assessment of recruit motivation and strength (ARMS) to determine what minimum level of fitness before entry onto active duty might reduce injuries and lower early attrition without adversely affecting recruiting and accession goals.

Five MEPS are proposed for the pilot ARMS in the Army. ARMS will consist of a 5-minute modified Harvard step test, push-ups, and weightlifting by incremental dynamic lift. Observations will be made on the applicant's ability to complete each task. ARMS results will be correlated with findings on the MEPS exam. Initially, the ARMS will not affect an applicant's ability to enter active duty. If approved, a subset of those with disqualifying conditions will be granted an automatic waiver for their condition to enter active duty based on their performance on ARMS. AMSARA will correlate the ARMS results with subsequent accession, injuries, and attrition.

The major hypothesis to be tested is whether ARMS results will better predict early success in the military than the medical screening exam alone. Success will be determined by the following: entrance onto active duty (whether those who pass the ARMS are more likely to enter active duty), EPTS attrition (whether those who admit to disqualifying conditions, pass the ARMS, and enter active duty will do better than those who have not admitted to any medical condition and do not pass the ARMS), and injury reduction (whether those who pass the ARMS will suffer fewer injuries during IET than those who do not pass).

The goal of ARMS is to assist the Army in accessing the most qualified applicants and in lowering attrition and reducing injuries during IET. It is anticipated that the initial phases of the study will be completed in 2004.

Small Business Innovative Research to Develop a Screening Test for Detection of Psychiatric Disorders in Young Adults

Psychiatric disorders are common in young adults aged 17–25 years, the age range of most military applicants, and are the leading cause of EPTS discharges. In 1998, approximately 30% of all EPTS discharges were due to psychiatric conditions, most of which were concealed at accession. These losses cost the military more than an estimated \$27.3 million in 1998 in recruiting and accession expenses alone; this estimate excludes the costs of medical care, subsequent disability discharges, and associated attrition.

Currently, there is no reliable screening tool for identifying individuals at risk for having a mental health problem. Various screening programs have been tried in the military and have given inconsistent results.

For phase I, AMSARA will develop a rapid, inexpensive, and reliable method to screen recruits for major psychiatric disorders or other behavioral factors that strongly predict occupational dysfunction in the military. Results will be standardized and interpretable by physicians without specialty training in psychiatry. The goals are to identify individuals with psychiatric disorders who should not enter active duty and to detect conditions that can be addressed with appropriate intervention before entry onto active duty (e.g., mental health counseling, cognitive group therapy, life skills training, etc.), thereby reducing attrition.

Possibilities for the screening tool include screening questionnaires, biochemical markers, or psychoactive pharmaceutical detection (to identify those who recently discontinued psychiatric medications). In 2003 two contractors were awarded \$100,000 each over 6 months during which a prototype screen was developed

For phase II, the screening methodology will be evaluated in a young population to determine sensitivity, specificity, positive predictive value, and ease of performance. A reasonable goal is to reduce attrition related to psychiatric disorders by 10% or greater. In 2003, two contractors were awarded \$750,000 each over 2 years. During this time, validation trials that are to be approved by the Army Surgeon General's Human Subjects Research Review Board at the Army Medical Research and Materiel Command are planned at MEPS to be determined. Efficacy trials will require funding beyond phase II.

The screen can also be effective in the civilian healthcare industry, particularly in the primary care setting where it offers the potential to correctly diagnose these conditions in a timely and cost-efficient manner and to ensure that patients are medically managed appropriately. This methodology can also help to assess the severity of the disorder and to monitor the response to therapy.

Survival Analysis of Recruits with a Waiver for Myopia

During 1999–2001, nearly 4,000 medical waivers for myopia were granted for enlistees in the Army, Navy, Air Force, and Marines. Additionally, during this same period, 29 EPTS medical discharges were granted for myopia, and 122 EPTS discharges were given for distant or near visual acuity of any degree. It is unknown if recruits entering active duty with a waiver for myopia are experiencing a greater rate of premature discharge compared with other recruits. However, given that recruiting, screening, and training cost about \$30,000 per enlistee, it is essential to determine if the premature discharge rate and EPTS medical discharge rate of recruits who are granted a waiver for myopia are greater than or comparable with the rates for other recruits.

The published literature on myopia and the military is scant. No survival analysis appears to have been performed on myopia; fortunately, the recent development of DoD databases now allows research regarding survival analyses. AMSARA will provide the results of this survival analysis to the service waiver authorities, who can use this epidemiologic, evidence-based information to assess the current myopia standard for recruits.

The primary outcomes will include myopia-related versus all-cause attrition rates and EPTS condition attrition rates. Intermediate outcomes will focus on morbidity to include both eye-related and all-cause hospitalizations and eye-related and all-cause disability. If feasible, degrees of myopia among study subjects waived for myopia will be assessed, along with baseline MEPS visual acuity data in these same subjects.

For a secondary data analysis, AMSARA will provide the following: 1) waiver data from the Army, Navy, Air Force, and Marines for 1999–2001, 2) gain and loss data from DMDC, 3) EPTS data from the U.S. Military Entrance Processing Command, and 4) hospitalization data from the DoD Standard Inpatient Data Record.

Records of individuals who received a waiver for myopia (and not for other conditions) will be selected from the AMSARA database. Individuals in the waiver database with incomplete gain data will be excluded. The final study group will consist of individuals receiving a waiver for myopia with complete gain data from 1999–2001. A pool of potential comparison subjects will consist of all first-time enlistees during 1999–2001 without waivers for myopia. The comparison group will be randomly selected from the gain data matched by age (within 1 year), month entering active duty, service, gender, age, and race at a ratio of three controls to one case.

Time-to-event analyses will be conducted using the Kaplan-Meier method. In addition to attrition from EPTS conditions related to myopia, disability and hospitalization comparisons will also be assessed, if the data are available.

4. DATA SOURCES

AMSARA requests and receives data from various sources, most of which are the primary collection agencies for the data they provide to AMSARA. Because data are seldom collected with the goal of epidemiologic study, AMSARA coordinates with the appropriate points of contact to ensure that the following major data types needed for AMSARA studies are in an appropriate form for epidemiologic work.

As mentioned in Appendix I, "Charter and Supporting Documents," AMSARA maintains strict confidentiality of all data it receives. No external access to the data is allowed, and internal access is limited to a small number of primary analysts on an as-necessary basis. Research results are provided only at the aggregate level, with no possibility of individual identification.

MEPS

AMSARA receives data on all applicants who undergo an accession medical examination at any of the 65 MEPS. These data, provided by MEPCOM, contain several hundred demographic, medical, and administrative elements on recruit applicants for each applicable branch (regular enlisted, reserve, National Guard) of each service (Air Force, Army, Coast Guard, Marines, and Navy). These data also include records on a relatively small number of officer recruit applicants and other nonapplicants receiving periodic physical examinations.

From the data records provided by MEPCOM, AMSARA extracts personal, medical, and administrative variables that are often of use in studies of military attrition. These include personal identifiers (e.g., name and SSN) for linking with other data, demographics (e.g., gender, age, and race) and a wide range of other information that is often relevant to military attrition studies (e.g., intended service, education level at the time of application, and AFQT scores).

In addition, the MEPS records provide extensive medical examination information, including date of examination, medical qualification status, medical failure ("disqualification") codes (where relevant), and any waiver requirements. Results of some specific tests are also extracted, including those of hearing/vision and alcohol/drug tests, and height, weight, and blood pressure measurements.

A medical disqualification is categorized as either "temporary" (condition that can be remediated, e.g., being overweight) or "permanent" (condition that remains with the applicant, e.g., history of asthma). For those applicants with a permanent disqualification, an accession medical waiver from a service-specific waiver authority is required for the applicant to be eligible for accession into the service (see "Waiver").

MEPS data are the primary source of demographic information on new accessions into the armed forces and of initial medical conditions and medical qualification status. These data are linked by AMSARA to DMDC gain files (see "DMDC Gain/Loss") to verify new accessions into the military and to provide benchmark descriptive statistics. These linked data

are also used in epidemiologic investigations related to the military's medical accession standards, such as selecting and matching subjects for survival studies to compare retention patterns among new recruits with various medical histories.

Two shortcomings in the MEPS data for AMSARA have been imprecise coding categories for medical disqualifications and missing or inaccurate data for some fields. Medical disqualifications are described only as broad categories, e.g., "chest and lungs" and "feet." As a further complication in the 2001 data, the coding scheme used for medical categories was changed. Because the new coding overlaps with the previous scheme, there is a period during which it is unclear under which scheme records were coded. Accordingly, AMSARA does not show medical disqualifications at MEPS by medical category for calendar year 2001.

Although the categorical coding of medical disqualifications has been retained, an initiative to provide more detailed coding of medical discharges (using ICD9 codes) was implemented by MEPCOM during calendar year 2001. This will allow more detailed studies of medical disqualifications in the future. An initial comparison of these codes to the categorical coding is provided in this report.

Officer Program Medical Examination Reviews

The DoD Medical Examination Review Board (DoDMERB) performs a role similar to that of the MEPS for officer programs. Specifically, DoDMERB schedules and reviews the results of physical examinations on applicants to officer programs. Applicants may be medically disqualified on the basis of these reviews, in which case a medical waiver would be required from the relevant waiver authority for the applicant to enter the program.

AMSARA has previously received DoDMERB data on officer program applicants who were medically examined for the academic years beginning in Fall 1999, Fall 2000, and Fall 2001. Data for the Fall 2002 applicants were not received in time for inclusion in this report.

Active Duty Enlistee Gain/Loss

The Defense Manpower Data Center (DMDC) provides data on individuals entering military service (gain or accession) and on individuals exiting military service (loss). Gain/loss data, which are AMSARA's primary sources of information about who is, or has been, in the military, include when an individual began duty and when or if an individual exited the military. From this information the length of service can be determined for any individual entering and leaving during the periods studied. This information is vital to survival analysis and attrition studies such as those presented in Section 1

Gain data include approximately 50 variables. Of these, AMSARA has identified 25 of primary interest: personal identifiers (e.g., name and SSN) for linking with other data, demographics (e.g., age, education, and AFQT score) at the time of accession, and service information (e.g., date of entry and basic training site). These data are combined with MEPS data to determine accession percentages among applicants by demographic and other variables. Also, as mentioned above, these linked data are used in epidemiologic investigations related to the military's medical accession standards.

Loss data also include approximately 50 variables, many of which are the same as those found in the gain file, although reflective of the individual's status at the time of loss rather

than at the time of gain. The variables of primary interest to AMSARA are personal identifiers for linking with other data, the loss date for computing length of service, and the interservice separation code as a secondary source of the reason for leaving the military. These data serve as the primary source of information on all-cause attrition from the service and are linked with the MEPS and gain data for studies of attrition.

A large problem in the gain data is lack of completeness, particularly for the Army from August 1997 to December 1997. AMSARA has found fewer than 800 records of new Army accessions for this period, which compares with an average of approximately 50,000 during the same months of 1995 and 1996. Analyses of accession percentages among individuals who applied for service before this time are therefore considered underestimates.

A problem with the loss data lies in the broad nature of the interservice separation code that characterizes the cause of the loss. Although each service maintains its own codes for describing discharge reasons, these are replaced at DMDC by a consolidated "interservice separation code" to provide a common coding system for all military discharges. Many categories have overlapping definitions, making it difficult to determine the real reason for discharge. For example, a discharge for EPTS pregnancy might be coded "pregnancy," "condition existing prior to service," or "fraudulent enlistment." This lack of specificity, as well as interservice differences in discharge categorizations, have been encountered in comparing other sources of loss information (EPTS, disability discharge data) with the DMDC loss data.

Waiver

AMSARA receives records on all recruits who were considered for an accession medical waiver, i.e., those who received a permanent medical disqualification at the MEPS (see "MEPS") and sought a waiver for that disqualification. Each service is responsible for making waiver decisions about its applicants. Data on these waiver considerations are generated and provided to AMSARA by each service's waiver authority. Although the specifics of these data vary by service, they generally contain identifiers (name and SSN) for linking with other data, demographics (gender, age, and race), and information about the waiver consideration.

In particular, each record contains the date of the waiver consideration, indicators of the medical condition(s) for which the waiver was required, and the decision of the waiver authority. The Air Force and Army code waiver conditions according to the full ICD9 coding scheme, whereas the Navy and Marines code waiver conditions according to the subset of ICD9 codes presented in DoD Instruction 6130.4 in association with medically disqualifying conditions.

Many of AMSARA's studies begin with the waiver data. Individuals granted a waiver for a particular medically disqualifying condition are matched to the DMDC gain file to determine their date of entry, if any, into the service. Those found to have begun active duty within a specified time constitute the pool from which the main study subjects, and often their comparison subjects, are drawn. Follow-up medical and attrition information during military service is appended to these records, and statistical comparisons can then be made. Specific details vary from study to study. A few additional details of the data provided by each service's waiver authority follow.

Air Force

The Air Force Directorate of Medical Services and Training transmits, upon request, data on all officer and enlisted accession medical waivers. These data include SSN, name, demographics, action (approved, disapproved, other), and date of waiver consideration. In addition, ICD9 codes are used to define the medically disqualifying condition(s) for which the waiver is being considered.

Army

The Army Recruiting Command (Fort Knox) has provided monthly electronic accession medical waiver data since January 1997. Each data record contains name, SSN, action (approved, disapproved, other), and date of waiver consideration. In addition, ICD9 codes are used to define the medically disqualifying condition(s) for which the waiver is being considered.

Marines

The Navy Bureau of Medicine and Surgery (BUMED) provides, on request, accession and commissioning medical waiver data for enlisted personnel and officers, along with data from special programs such as ROTC and the Naval Academy. Data include name, SSN, demographics, date of waiver consideration, and recommended action (approval, disapproval, other). In addition, the subset of ICD9 diagnosis codes listed in DoD Instruction 6130.4 is used to indicate the medically disqualifying condition(s) for which the waiver is being considered.

Navy

The office of Commander, Navy Recruiting Command, provides accession medical waiver data on applicants for enlisted service in the Navy from May 2000 to the present. Before May 2000, enlisted medical accession waivers for the Navy were considered by BUMED, which then provided data to AMSARA. Data include name, SSN, demographics, date of waiver consideration, and action (approved, disapproved, other). In addition, the subset of ICD9 diagnosis codes listed in DoD Instruction 6130.4 is used to indicate the medically disqualifying condition(s) for which the waiver is being considered.

Hospitalization

The Patient Administration Systems and Biostatistics Activity of the Army Medical Department has provided hospitalization data on a yearly basis for all services except the Coast Guard. These data contain information on admissions of active duty officers and enlisted personnel to any military hospital. Information on each visit includes SSN for linking with other data, demographics (e.g., gender, age, and race), and details about the hospitalization. In particular, the medical nature of the hospitalization is coded according to the ICD9, with up to eight codes per record to describe all conditions found. Date of admission, date of disposition, number of sick days, number of bed days, and indicators of the medical outcome are also included.

Uncertainty over the coverage and ramifications of the Health Insurance Portability and Accountability Act (HIPAA) resulted in a delay of hospitalization data transmission for services other than the Army during the past year. Accordingly, only Army hospitalization data will be summarized in the descriptive tables of this report. Formal arrangements have now been made to allow transmission of all-service hospitalization data to AMSARA in

compliance with HIPAA, so it is expected that hospitalization data from all services will be summarized in the 2004 AMSARA Annual Report.

EPTS Discharges

Discharges for EPTS medical conditions are of vital interest to AMSARA. A discharge for a medical condition can be classified as an EPTS discharge if the condition was verified to have existed before the recruit began service and if the complications leading to discharge arose no more than 180 days after the recruit began duty. MEPCOM requests a copy of official paperwork on all EPTS discharges and records certain information about each. This information includes a rough medical categorization (20 categories) of the reason(s) for discharge and a judgment on each discharge regarding why (concealment, waiver, or unawareness) the person was not rejected for service on the basis of the preexisting condition.

Beginning in August 1996, this paperwork has been regularly forwarded by MEPCOM to AMSARA for additional data extraction, including more specific coding of medical conditions leading to discharge. This paperwork was unavailable for EPTS discharges occurring from 1995 through 1996, so AMSARA uses the data recorded by MEPCOM for this period.

The primary concern with the EPTS discharge data is completeness. Table 5.1 summarizes the numbers of records provided to AMSARA over calendar years 1997–2003. Note that the numbers of records have been unstable over time for nearly all basic training sites. Some variability in numbers of EPTS records over time may be due to real fluctuations in EPTS discharge rates or to changes in the numbers of at-risk individuals (e.g., new accessions), although accession numbers of active duty personnel have been fairly stable over this period. Another possible source of fluctuation is changing schemes for categorizing discharges.

Although the provision of EPTS discharge paperwork to MEPCOM is encouraged, it is not a legal requirement. Underreporting is clearly a major source of fluctuation in the numbers of reported records. For example, Lackland AFB provided only 105 records for calendar year 2000 and 228 records in 2001, whereas Lackland had provided close to 1,000 records in each of the 3 previous years. A similarly dramatic drop in EPTS records has been seen from the Marine Corps depot in San Diego during 2001 and 2002. All training sites have had fluctuation in EPTS numbers well beyond what could be expected from random variation.

AMSARA has addressed many of these data inconsistencies with on-site officials and continues to emphasize the importance of these data to assessing and improving the fitness of future recruits.

TABLE 4.1. EPTS DISCHARGE DATA REPORTED TO MEPCOM BY TRAINING SITE AND YEAR*

Site	1997	1998	1999	2000	2001	2002	Total
Air Force							
Lackland AFB	1,000	1,070	994	105	228	784	4,181
Army							
Fort Jackson	1,913	1,767	712	354	676	821	6,243
Fort Leonard Wood	1,426	1,455	1,243	1,575	1,485	862	8,046
Fort Benning	387	535	890	1,212	1,127	1,368	4,718
Fort Sill	333	464	713	794	147	314	5,394
Fort Knox	666	653	506	599	649	582	3,655
Marines							
Parris Island	1,069	1,054	808	551	745	1,080	5,307
San Diego	743	492	526	656	193	116	2,726
Navy							
Great Lakes	3,542	5,343	2,664	1,913	1,865	1,873	17,200
Total	11,079	12,833	9,056	7,759	7,115	7,800	57,470

*Numbers may not sum to totals shown in Section 2 because information from specific training sites is incomplete and other requirements for records are different.

In light of these shortcomings in the data, comparisons of EPTS discharges across services, or even across different training sites within the same service, should be interpreted with caution. Disparities may reflect differences in reporting procedures more than actual differences in discharge likelihood. Furthermore, counts of EPTS records should not be construed as representing all EPTS discharges. Instead, EPTS counts only represent discharges for which data were reported.

Disability

Data on disability discharge considerations are compiled separately for each service at its disability agency. The Army agency has provided data on all disability discharge considerations during 1995–2002 and continues to provide these data. The Air Force has provided such data in the past, but technical difficulties prevented transmission of data for discharges during CY 2002. The Navy/Marines agency has provided data only on a diagnosis-specific request basis rather than for all actions. Therefore, only Army disability discharge data were summarized in Section 2.

The Army physical disability agency provides information on all disability cases considered, including personal identifiers (name and SSN), program (regular enlisted, academy, and officer), date of consideration, and disposition (permanent disability, temporary disability, or return to duty as fit). For individuals receiving a disability discharge, medical condition codes and degree of disability are also included.

The medical condition(s) involved in each case are described using the condition codes of the Veterans Administration Schedule for Rating Disabilities. This set is less comprehensive than the ICD9 codes. In some cases the disabling condition does not have an associated code, so the code most closely resembling the true condition is used. AMSARA therefore only uses broad categories of disability condition codes rather than attempting to interpret specific codes.

Navy Recruit Training Management and Standard Training Activity Support System

The Navy's Recruit Training Management and Standard Training Activity Support System contains a large volume of data of interest to AMSARA. For each individual entering the Navy, this system collects much of the background information contained in the MEPS data. The system also maintains dates of arrival at basic training, transfer dates and locations, indicators of any medical visits while in training, and up-to-date duty locations of all Navy and Marine personnel. In addition to being a confirming source for MEPS and gain data on Navy personnel, this system allows daily tracking of individuals in training with the Navy, a vital component of Project REMAIN (see Section 1).

CHARTER AND SUPPORTING DOCUMENTS



HEALTH AFFAIRS

THE ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D. C. 20301-1200

DEC 06 1995

MEMORANDUM FOR SURGEON GENERAL OF THE ARMY

SUBJECT: Military Medical Standards Analysis and Evaluation Data Set

The personnel community has asked OASD/HA to develop a fact based accessions policy to minimize medical attrition, quantitate risk in medical waivers, and to defend accession decisions when challenged.

The offices of Clinical Services and Military Personnel Policy have worked closely with epidemiologists at Walter Reed Army Institute of Research on the concept of a Military Medical Standard Analysis and Evaluation Data Set (MMSABDS) to apply quantitative analysis to a longitudinal data base.

The Army Center for Health Promotion and Preventive Medicine (CHPPM) maintains a data base of personnel, hospitalization, deployment and separation information for all Services. I would like WRAIR, in coordination with CHPPM, to serve as consultants to the Accession Medical Standard Steering Committee, modify and maintain the data base, and coordinate field research to answer specific questions germane to accession policy.

Therefore, I request that, by the end of December 1995, a proposal be submitted through you from WRAIR, outlining the consultant role and modifications needed to the data base. This should include funding requirements.

Edward D. Martin /br
Stephen C. Joseph, M.D., M.P.H.

cc:
Commander WRAIR

HA Control #: NONE
Due Date: NONE

February 28, 1995

ASSISTANT SECRETARY OF DEFENSE
(HEALTH AFFAIRS)
EXECUTIVE SUMMARY/COVER BRIEF

MEMORANDUM FOR THE ASSISTANT SECRETARY OF DEFENSE
(HEALTH AFFAIRS)

THROUGH: *Jm* Dr. Sue Bailey, DASD (CS)
FROM: Action Officer, Colonel Ed Miller
SUBJECT: Accession Medical Standards Analysis and Research
Activity (AMSARA)

PURPOSE:

SIGNATURE--on request that the Assistant Surgeon General of the Army (Research and Development) establish an Accession Medical Standards Analysis and Research Activity (AMSARA).

DISCUSSION:

The Accessions Medical Standards Working Group which met over the summer sponsored through MFIM funding completed a functional economic analysis of the medical accessions examination process. One of the critical recommendations made by the Group was to establish a research activity to provide the Medical Accessions Standards Council (also recommended) with an evidence-based analysis of DoD accessions medical standards. The memorandum tasks the Army with the responsibility of establishing the activity resourced under the Defense Health Program. This has already been staffed with the Assistant Surgeon General of the Army (Research and Development)

RECOMMENDATION:

Sign tasking memorandum to Army Surgeon General.

COORDINATION:

✓ Mr. Conte, PDUSD(P&R) _____
✓ Mr. Maddy, HB&P: See attached memo
✓ Mr. Richards, EO: _____
Dr. Martin, PDASD: _____

DEPARTMENT OF DEFENSE
ACCESSION MEDICAL STANDARDS
STEERING COMMITTEE

CHARTER

I. ESTABLISHMENT, PURPOSE AND SCOPE

A. ESTABLISHMENT

The Under Secretary of Defense (Personnel and Readiness) establishes a Department of Defense Accession Medical Standards Steering Committee (hereafter referred to as the "Committee".) The Committee shall operate under the joint guidance of the Assistant Secretaries of Defense (Force Management Policy and Health Affairs [FMP & HA].)

B. PURPOSE

The Committee's main objective is to ensure the appropriate use of military members with regard to medical/physical characteristics, assuring a cost-efficient force of healthy members in military service capable of completing initial training and maintaining worldwide deployability. The primary purposes of the Committee are: (1) integrating the medical and personnel communities in providing policy guidance and establishing standards for accession medical/physical requirements, and (2) establishing accession medical standards and policy based on evidence-based information provided by analysis and research.

C. SCOPE OF ACTIVITY

1. The Committee's responsibility involves:

- a. Providing policy oversight and guidance to the accession medical/physical standards setting process.
- b. Directing research and studies necessary to produce evidenced-based accession standards making the best use of resources.
- c. Ensuring medical and personnel coordination when formulating accession policy changes.
- d. Overseeing the common application of the accession medical standards as outlined in DoD Directive 6130.3, "Physical Standards for Appointment, Enlistment, and Induction."

e. Interfacing with other relevant Department of Defense and Department of Transportation organizations.

f. Recommending promulgation of new DoD directives as well as revisions to existing directives.

g. Recommending legislative proposals concerning accession medical/physical processing.

h. Reviewing, analyzing, formulating and implementing policy concerning the accession physical examination.

i. Issuing policy letters or memoranda providing interpretation of provisions of DoD directives.

j. Resolving conflicts of application of accession medical/physical standards and policies among the Military Services and other authorized agents.

k. Maintaining records and minutes of Committee meetings.

II. ORGANIZATION

A. The Committee will be co-chaired by the Deputy Assistant Secretary of Defense (Military Personnel Policy) and the Deputy Assistant Secretary of Defense (Clinical Services). This will facilitate tasking the Deputy Chiefs of Staff for Personnel and the Surgeons General to assign staffers to relevant working groups, and to ensure DCS/Personnel and Surgeon General personal involvement with the various issues. The Committee will convene semiannually, at a minimum, and at the discretion of the Chairpersons.

B. Committee members are appointed by the Under Secretary of Defense (Personnel and Readiness) and provide ongoing liaison with their respective organizations concerning matters of medical/physical accession policy.

C. The Committee shall be composed of representatives from the following:

Office of the Assistant Secretary of Defense (Force Management Policy)

Office of the Assistant Secretary of Defense (Health Affairs)

Office of the Assistant Secretary of Defense (Reserve Affairs)

Office of Service Surgeons General

Office of Service Deputy Chiefs of Staff for Personnel, and Chief of Personnel and Training, HQ U.S. Coast Guard.

D. Representatives from the Office of the Assistant Secretary of Defense (Force Management Policy) and the Office of the Assistant Secretary of Defense (Health Affairs) shall serve as executive secretaries for the Committee, and maintain a working group, composed of representatives from each of the offices mentioned above, to receive and review issues pertinent to accession policy.

E. The Commander, U.S. Military Entrance Processing Command, and the Director, DoD Medical Examination Review Board shall serve as advisors to the Committee.

F. The Committee may invite consultants (i.e., training, recruiting, epidemiology) at the discretion of the Chairpersons.

Approved: JAN 16 1996
Date

A handwritten signature in black ink, consisting of a series of loops and a long horizontal stroke extending to the right.

EDWIN DORN

Acronyms

AD	active duty	HS	high school
AFB	Air Force base	HSIL	high-grade squamous intraepithelial lesion
AFQT	armed forces qualifying test	ICC	invasive cervical carcinoma
AMSARA	Accession Medical Standards Analysis and Research Activity	ICD9	international classification of diseases, 9 th revision
AMSWG	Accession Medical Standards Working Group	IET	Initial Entry Training
ASCUS	atypical squamous cells of undetermined significance	ISC	Inter-service Separation Code
BCT	Basic Combat Training	LSIL	low-grade squamous intraepithelial lesion
BMI	Body Mass Index	MEBITT	Medical Examination Boards Internal Tracking Tool
CHPPM	Center for Health Promotion and Preventive Medicine	MEPCOM	military entrance processing command
CI	confidence interval	MEPS	military entrance processing station
CIN	cervical intraepithelial neoplasia	NA	not applicable
CSB	College Scholarship Branch	NIHL	noise induced hearing loss
CY	calendar year	PAD	Patient Administrative Division
df	degrees of freedom	PASBA	Patient Administration Systems and Biostatistical Activities
DMDC	Defense Manpower Data Center	RAP	Recruit Assessment Program
DMSS	Defense Medical Surveillance System	ROTC	Reserve Officer Training Corp
DoD	Department of Defense	RR	relative risk
DoDMERB	DoD Medical Examination Review Board	SSN	social security number
DQ	disqualification	TMD	temporomandibular disorder
EPTS	existed prior to service	WRAIR	Walter Reed Army Institute of Research
FEV	forced expiratory volume		
GED	general educational development		



Accession Medical Standards Analysis & Research Activity

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